# The McALEAR System

## The biggest forward step in the Science of Steam Heating

# 25 years of Know How

This is not a mere catalog—it is a ready reference book on the McAlear System of Vacuum and Vapor Heating. It has been prepared as the result of twenty-five years actual experience—it contains in detail a complete description of the McAlear System and appliances—it is an authoritative text book on the Science of Steam Heating for all classes of buildings.

This book is dedicated to every one who comes in contact with heating problems. On page 3 you will find an outline of the unequalled McAlear Service which we are prepared to render you free of charge—also our Ironclad Guarantee of Satisfaction.

THE McALEAR MFG. CO.
223 West Erie Street
CHICAGO

DISTRICT SALES OFFICE,
705 OURAY BUILDING,
WASHINGTON, D. C.
L. C. HOLMES - MANAGER

# McALEAR SYSTEM

## The Result of 25 Years of Experience

In presenting this Catalog to building owners, architects, engineers and steam heating contractors, particular attention is called to the fact that the McALEAR SYSTEM is not an experiment—it is the result of an organization extending throughout the United States and Canada, including a special engineering staff composed of some of the best engineers in this country, who have for the past twenty-five years specialized in the science of Vacuum and Vapor heating.

Our organization is ready to prove to your entire satisfaction that we have mastered the problems of designing, and superintending complete installations of power and heating equipment for any and all classes of buildings.

Upon request we will furnish you with a list and description of all classes of buildings in which our system is being successfully operated.

In addition, on page 3 you will find our Iron Clad Guarantee to replace Free of Charge any defective parts of any materials furnished by us.

With the tenants of buildings constantly demanding better service—and the cost of fuel soaring upwards—in selecting any steam heating system the first cost is not the only cost to be considered—you must take into consideration the equally important questions of low cost of operation, prevention of leaks and losses, minimum expense for repairs, maximum durability, absolute noiselessness as well as safety, comfort and economy—and this is what we claim and can prove for the McALEAR SYSTEM.

# McAlear Service Unequalled

## Engineering Advice—Specific Information
## Full Co-operation—FREE

Under the McAlear System you are not offered merely patented appliances—you have the right at any time to ask for and receive cheerfully the services of our special Engineering Department, composed of some of the best engineers in this country—men who for the past twenty-five years have given their entire time and attention to the solving of engineering problems, designing and superintending complete installations of power and heating equipment for any and all classes of buildings.

Engineers, architects, steam heating contractors and building owners find it saves time and is profitable to use this service, why not you?

Our Engineering Department is thoroughly competent to give engineering advice and specific information on all subjects pertaining to the mechanical equipment of buildings and this service is combined with quality and efficiency, an asset, and is free to you for the asking.

Submit your problems to us and we will advise you the best method to work them out for the least expenditure of money—always keeping in mind the question of efficiency which is being constantly strived for by all successful men and corporations. You are familiar with the old saying, "A teaspoonful of foresight is worth a barrel full of hindsight,—ASK US.

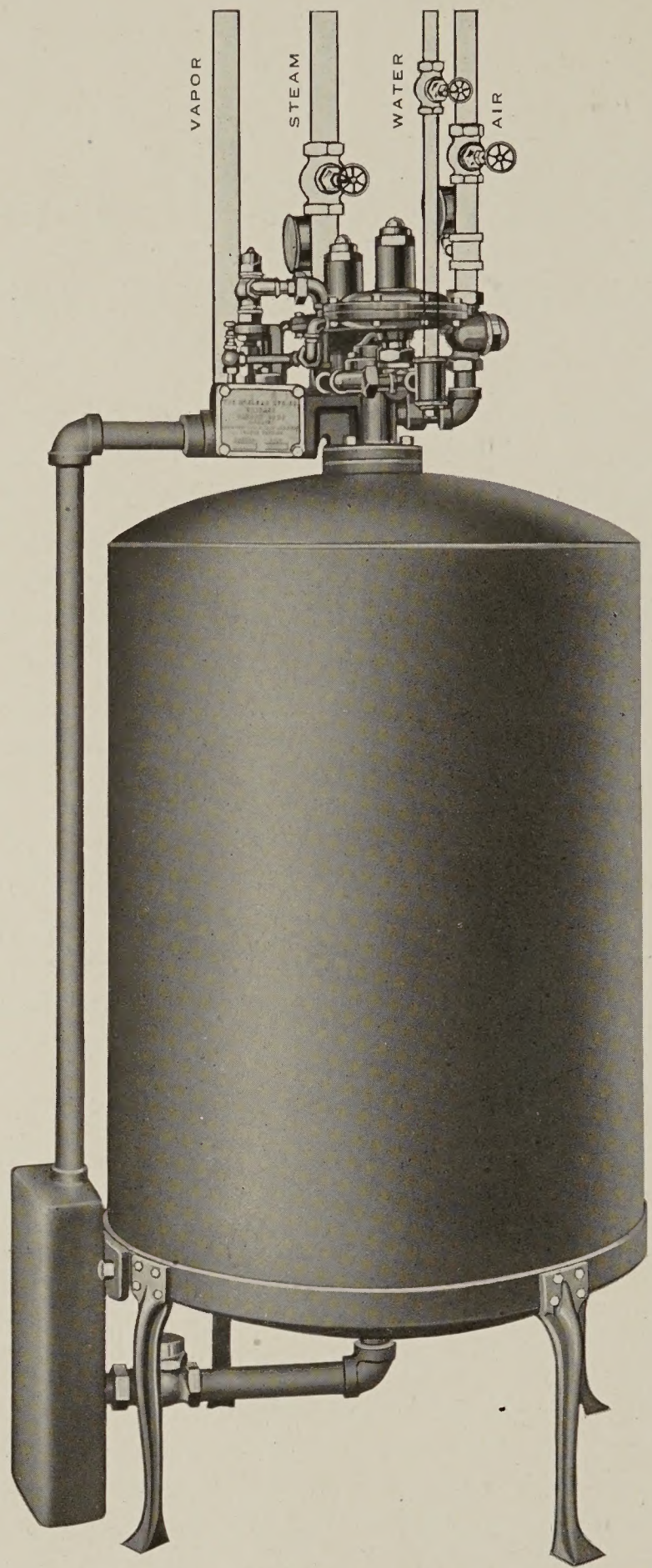
## Iron Clad Guarantee of Satisfaction

Knowing from actual experience on thousands of buildings that the McAlear System if properly installed will give absolute satisfaction and that our specialties will perform their respective functions in a very efficient and satisfactory manner—we do not hesitate to make this Iron Clad Guarantee.

We will replace FREE OF CHARGE any defective parts of any material or materials furnished by us, provided that such defective material is reported to us within a reasonable length of time from the receipt of the goods or the date of installation.

In addition, we also GUARANTEE our Vacuum Pumps, Thermo Vent Automatic Air Valves and Perfection Radiator Traps to be ABSOLUTELY AUTOMATIC and NOISELESS in operation and to handle water and air in any quantities up to their rated capacities.

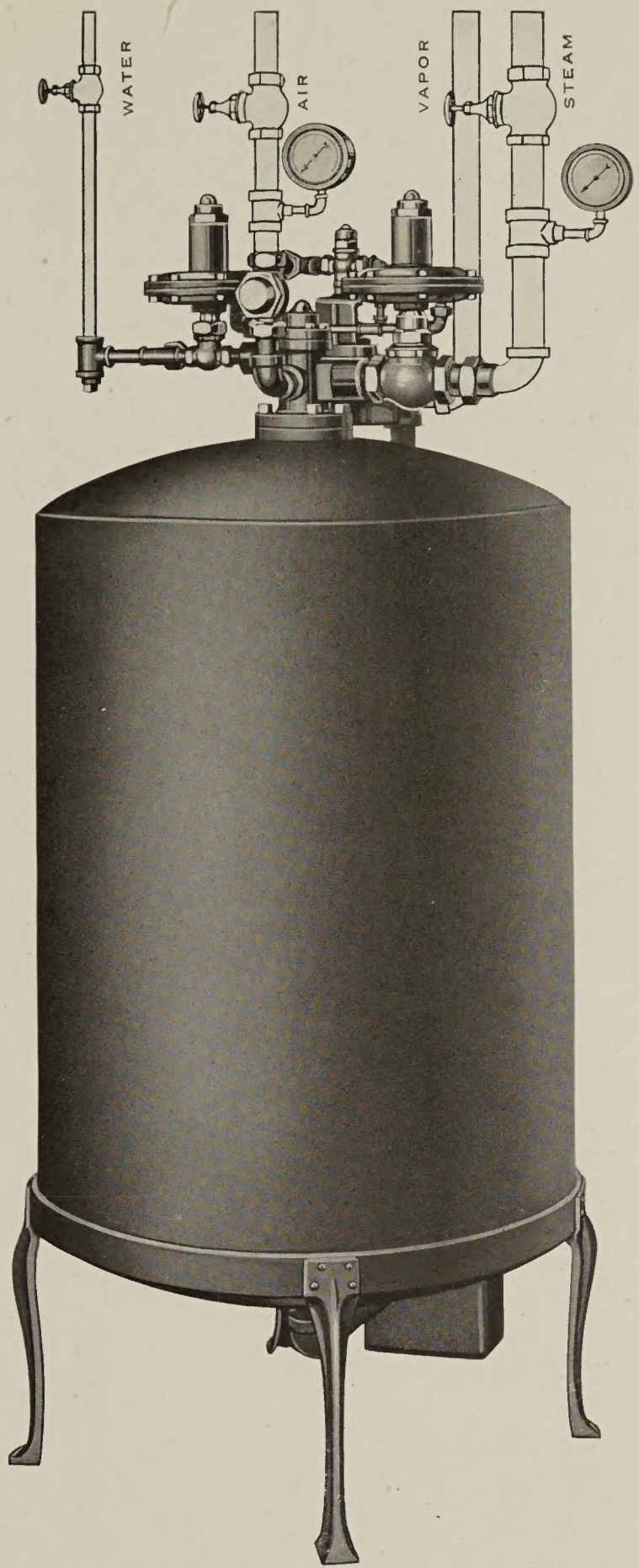
THE McALEAR MANUFACTURING COMPANY
223 West Erie Street, Chicago, U. S. A.




Front view of the McAlear Automatic Vacuum Pump.
(Patented and Patents Pending)

In ordering repair parts, refer to numbers, pages 6 and 7.

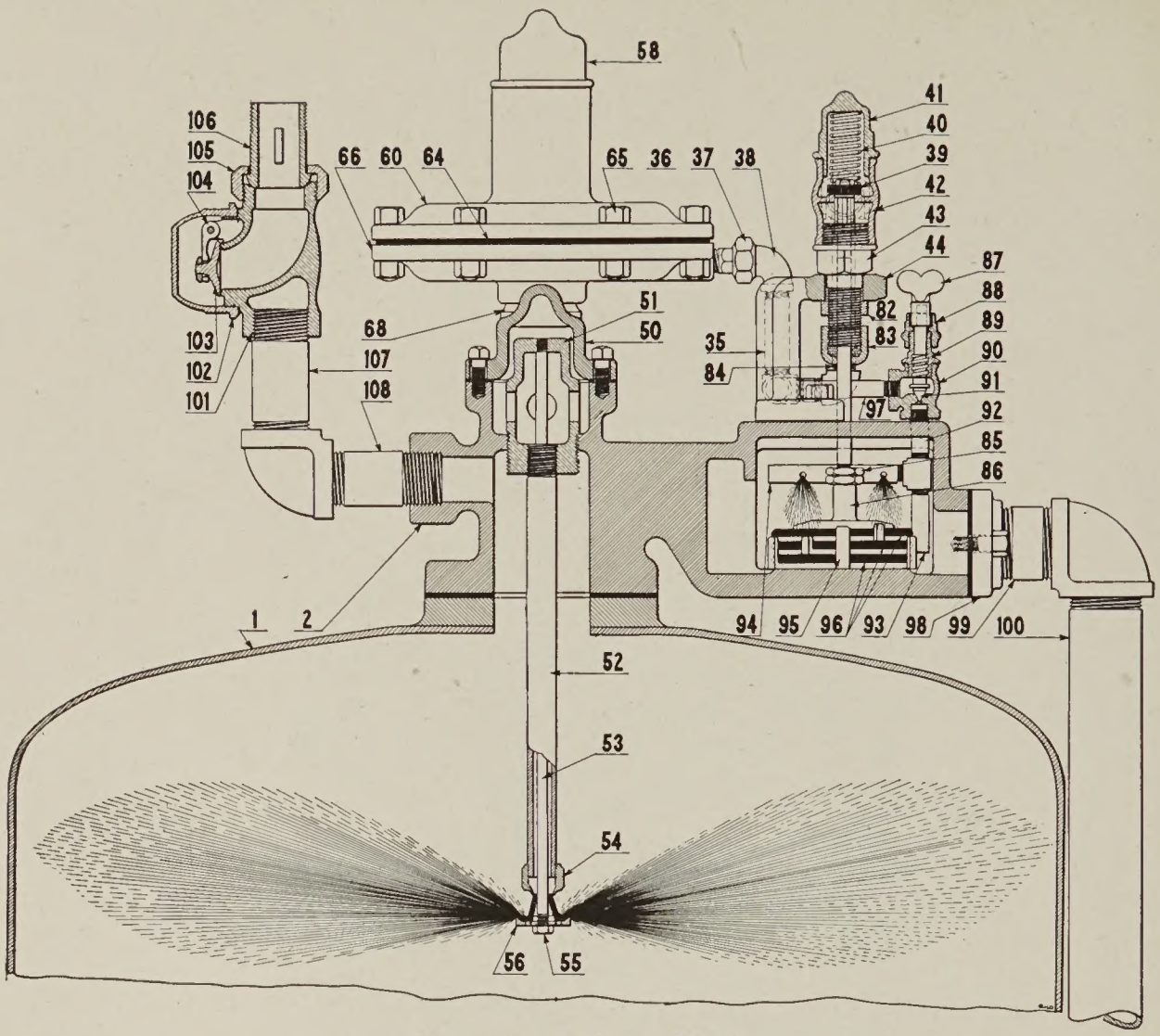
We do not furnish with pump any of the piping or fittings shown in light lines, except the vacuum and steam gauges.



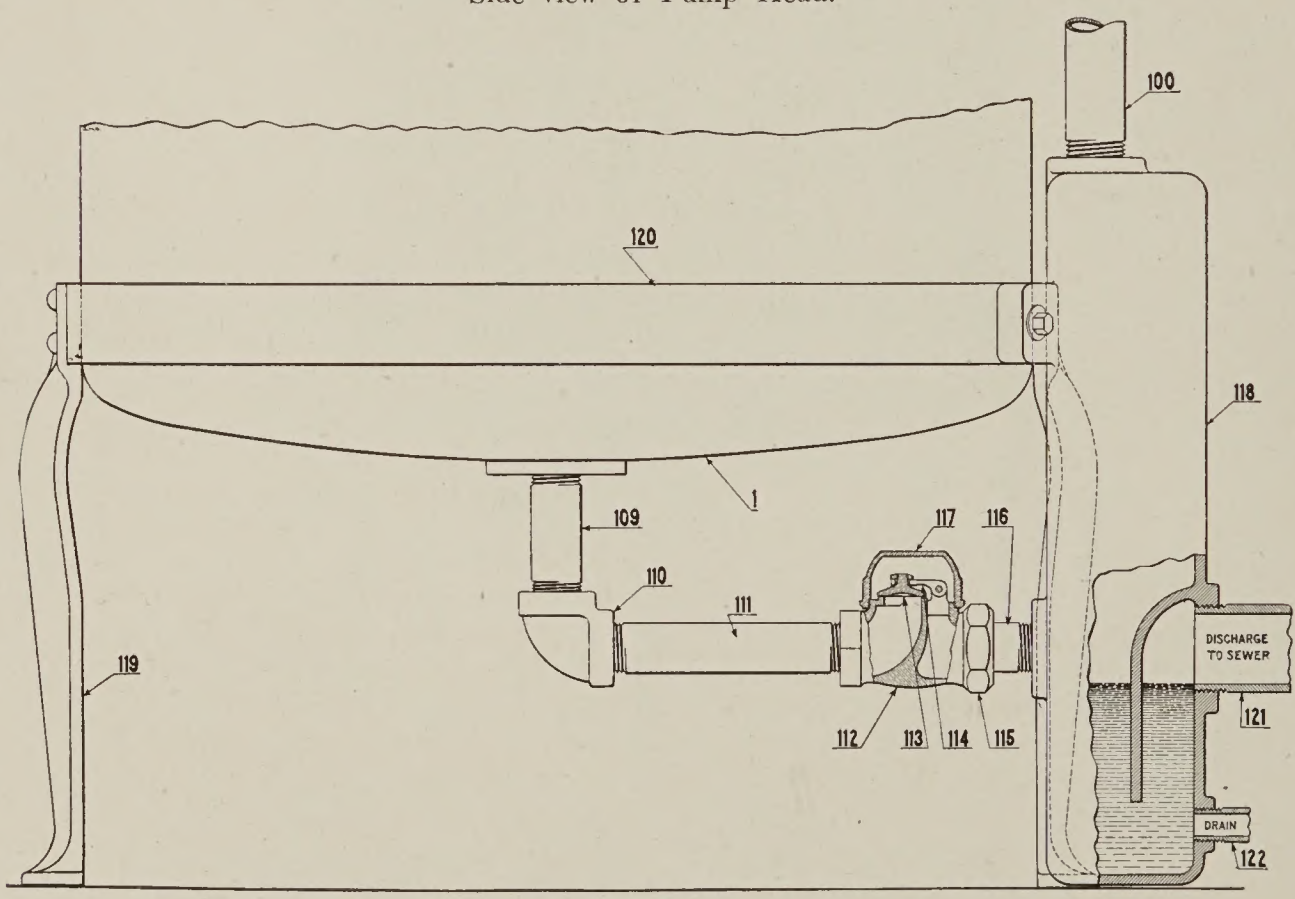

Back view of the McAlear Automatic Vacuum Pump.
(Patented and Patents Pending)

In ordering repair parts, refer to numbers, pages 6 and 7.

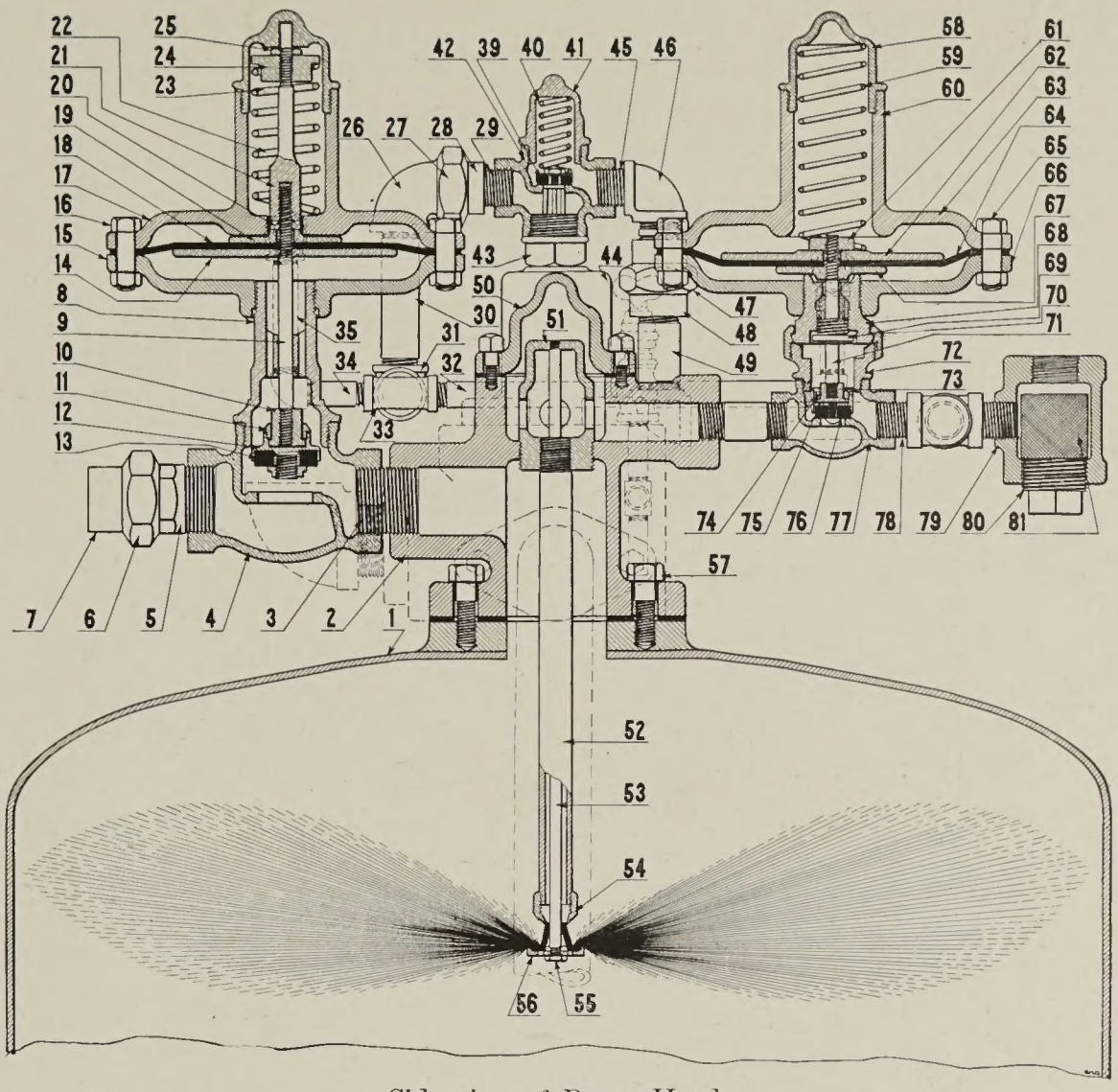
We do not furnish any of the pipe connections or fittings shown in light lines, except the vacuum and steam gauges.




Side view of Pump Head.




Bottom view of Pump Cylinder.




Side view of Pump Head.

# List of Parts

NAME AND NUMBER OF PARTS.

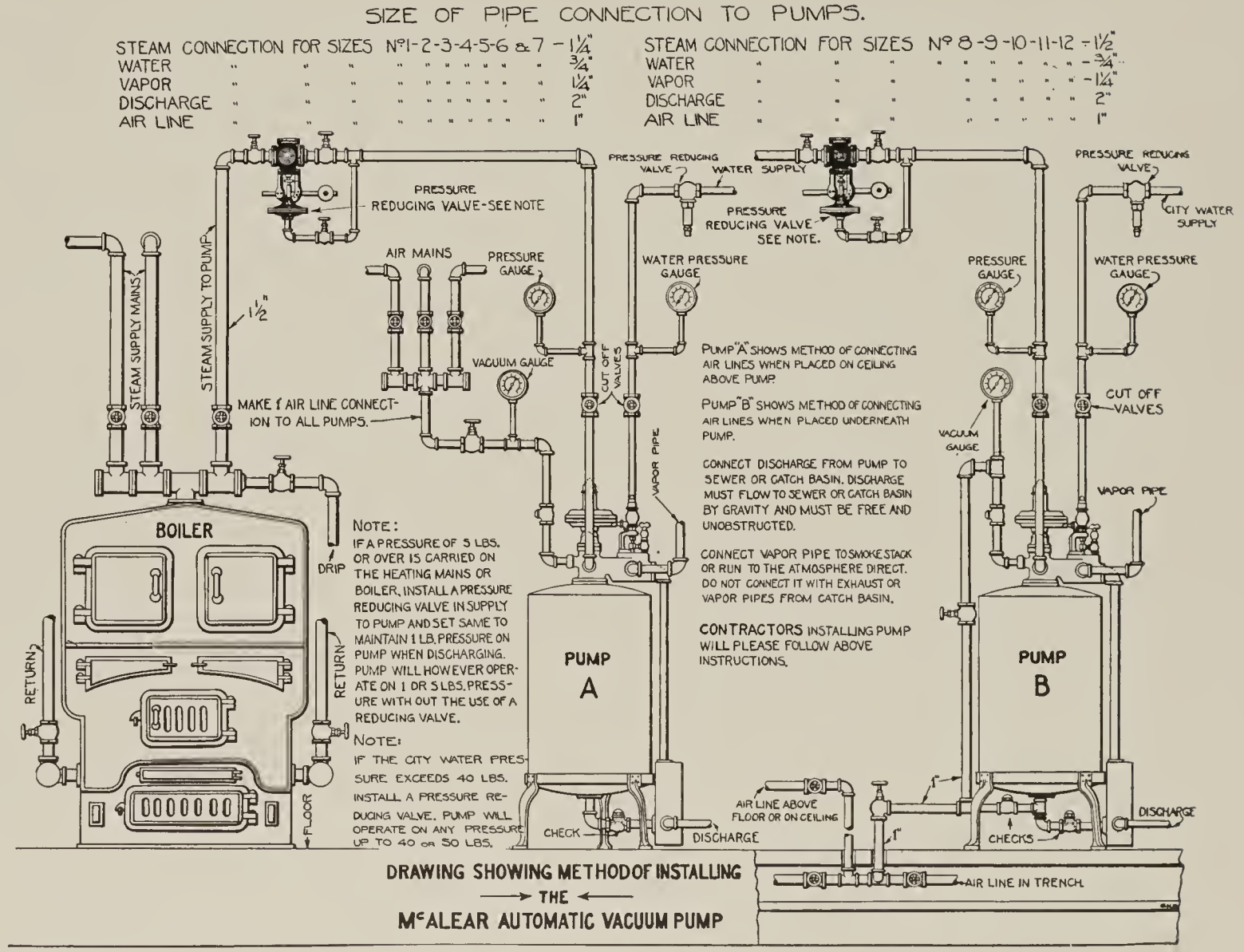
1 Pump Cylinder
2 Supporting Head
3 Nipple
4 Steam Valve Body
5 Union Tail Piece
6 Union Nut
7 Union Coupling
8 Valve Bonnet
9 Valve Stem
10 Stem Head
11 Disc Holder Ring
12 Disc Holder
13 Composition Disc
13A Disc Holder Nut
14 Lower Diaphragm Plate, large
15 Lower part of Diaphragm Casting
16 Bolts
17 Upper part of Diaphragm Casting
18 Rubber Diaphragm
19 Upper Diaphragm Plate, small
20 Lock Nut
21 Upper part of Valve Stem
22 Spring for Steam Valve
23 Brass Cap
24 Spring Holder
25 Adjustment Nut

26 Union Elbow
27 Union Nut
28 Union Tailpiece
29 Nipple
30 Nipple
31 Elbow
32 Nipple
33 Tee
34 Nipple
35 Nipple
36 Union Tail Piece
37 Union Nut
38 Union Ell
39 Pilot Valve Disc
40 Pilot Valve Spring
41 Cap for Pilot Valve
42 Pilot Valve Body
43 Pilot Valve Bonnet
44 Pilot Valve Bracket
45 Nipple
46 Elbow
47 Union Nut
48 Union Tail Piece
49 Nipple
50 Cap Flange over Spray Pipe Opening
51 Spray Plug
52 Spray Tube
53 Spray Plate Stem
54 Spray Nozzle
55 Lock Nut
56 Spray Plate
57 Cap Screws
58 Brass Cap
59 Spring for Water Valve
60 Upper part of Diaphragm Casting
61 Lock Nut
62 Upper Diaphragm Plate, large
63 Upper part of Diaphragm Casting
64 Rubber Diaphragm
65 Bolt
66 Lower part of Diaphragm Casting
67 Lower Diaphragm Plate, small
68 Stuffing Box
69 Stuffing Box Nut
70 Union Nut for Water Valve
71 Valve Stem for Water Valve
72 Valve Bonnet for Water Valve
73 Stem Head
74 Disc Holder Ring
75 Composition Disc
76 Disc Screw
77 Water Valve Body
78 Nipple
79 Strainer Tee
80 Strainer Plug
81 Strainer Basket
82 Lock Nut for Pilot Valve Bonnet
83 Stuffing Box for Pilot Valve Bonnet
84 Valve Stem for Pilot Valve
85 Lock Nuts for Pilot Valve Stem
86 Adjustable Piston Plate
87 Key for Operating Water Valve
88 Lock Shield Stuffing Box
89 Valve Bonnet
90 Needle Valve Body
91 Needle Valve Stem
92 Nipple
93 Nipple
94 Spray Pipe for Thermostatic Disc
95 Separating Spiders
96 Thermostatic Discs
97 Nipple
98 Flange for Water Seal Trap connections
99 Nipple
100 Pipe Connection to Water Seal
101 Air Check Valve Body
102 Air Check Valve Cap
103 Air Check Valve Disc
104 Air Check Valve Hinge
104A Air Check Valve Hinge Nut
105 Air Check Valve Union Nut
106 Air Check Valve Tail Piece
107 Nipple
108 Nipple
109 Nipple
110 Elbow
111 Nipple
112 Discharge Check Valve Body
113 Discharge Check Valve Disc
114 Discharge Check Valve Hinge
114A Discharge Check Valve Hinge Nut
115 Discharge Check Valve Union Nut
116 Discharge Check Valve Tail Piece
117 Discharge Check Valve Cap
118 Water Seal Trap
119 Supporting Leg
120 Supporting Band
121 Discharge Pipe
122 Drain

Your particular attention is directed to the paragraph under heading "Note" which reads as follows: If a pressure of 5 pounds or over is carried on the heating mains and boiler, install a pressure reducing valve in supply to pump and set same to maintain one pound pressure on pump when discharging. Pump will, however, operate on one to five pounds' pressure without the use of a reducing valve.

The pressures of five pounds referred to in above paragraph should read "10 pounds." Therefore, bear in mind that the pump will operate on any pressure from 0 to 10 pounds without the use of a steam reducing valve. If the pressure exceeds 10 pounds a reducing valve should be installed.




SIZE OF PIPE CONNECTION TO PUMPS.
STEAM CONNECTION FOR SIZES Nº 1-2-3-4-5-6 & 7 - 1¼"
WATER " " " " " " " " " " 3/4"
VAPOR " " " " " " " " " " 1¼"
DISCHARGE " " " " " " " " " " 2"
AIR LINE " " " " " " " " " " 1"
STEAM CONNECTION FOR SIZES Nº 8-9-10-11-12 - 1½"
WATER " " " " " " " " " " - 3/4"
VAPOR " " " " " " " " " " - 1¼"
DISCHARGE " " " " " " " " " " 2"
AIR LINE " " " " " " " " " " 1"
PRESSURE REDUCING VALVE-SEE NOTE
PRESSURE REDUCING VALVE
WATER SUPPLY
PRESSURE REDUCING VALVE SEE NOTE.
PRESSURE REDUCING VALVE
CITY WATER SUPPLY
AIR MAINS
PRESSURE GAUGE
WATER PRESSURE GAUGE
PRESSURE GAUGE
WATER PRESSURE GAUGE
STEAM SUPPLY MAINS
STEAM SUPPLY TO PUMP
1½"
VACUUM GAUGE
CUT OFF VALVES
MAKE 1 AIR LINE CONNECTION TO ALL PUMPS.
VACUUM GAUGE
CUT OFF VALVES
VAPOR PIPE
VAPOR PIPE
BOILER
DRIP
RETURN
RETURN
FLOOR
PUMP A
PUMP B
CHECK
DISCHARGE
AIR LINE ABOVE FLOOR OR ON CEILING
CHECKS
DISCHARGE
AIR LINE IN TRENCH
NOTE:
IF A PRESSURE OF 5 LBS. OR OVER IS CARRIED ON THE HEATING MAINS OR BOILER, INSTALL A PRESSURE REDUCING VALVE IN SUPPLY TO PUMP AND SET SAME TO MAINTAIN 1 LB. PRESSURE ON PUMP WHEN DISCHARGING. PUMP WILL HOWEVER OPERATE ON 1 OR 5 LBS. PRESSURE WITH OUT THE USE OF A REDUCING VALVE.
NOTE:
IF THE CITY WATER PRESSURE EXCEEDS 40 LBS. INSTALL A PRESSURE REDUCING VALVE. PUMP WILL OPERATE ON ANY PRESSURE UP TO 40 OR 50 LBS.
PUMP "A" SHOWS METHOD OF CONNECTING AIR LINES WHEN PLACED ON CEILING ABOVE PUMP.
PUMP "B" SHOWS METHOD OF CONNECTING AIR LINES WHEN PLACED UNDERNEATH PUMP.
CONNECT DISCHARGE FROM PUMP TO SEWER OR CATCH BASIN. DISCHARGE MUST FLOW TO SEWER OR CATCH BASIN BY GRAVITY AND MUST BE FREE AND UNOBSTRUCTED.
CONNECT VAPOR PIPE TO SMOKE STACK OR RUN TO THE ATMOSPHERE DIRECT. DO NOT CONNECT IT WITH EXHAUST OR VAPOR PIPES FROM CATCH BASIN.
CONTRACTORS INSTALLING PUMP WILL PLEASE FOLLOW ABOVE INSTRUCTIONS.
DRAWING SHOWING METHOD OF INSTALLING
THE
McALEAR AUTOMATIC VACUUM PUMP

# Operation of the McAlear Automatic Vacuum Pump and its Advantages

So that you will understand how simple and easy is the operation of The McAlear Automatic Vacuum Pump and why it cannot fail to live up to the claims we make for it, here is a brief outline of the facts.

**The Pump** consists of a large cylinder which stands vertically on a substantial base. On top of the cylinder is mounted the Automatic Valve mechanism to which all air, steam and water connections are made.

The air connections consist of the vacuum air lines, which connect with all of the air valves on the radiators throughout the building or plant, as hereafter outlined and described in the specifications. Pages 33 to 35 inclusive.

The steam for operating the pump is taken from low-pressure heating main or from boiler direct (if operated low-pressure), and connected to the steam valve, which is made a part of the Automatic Valve mechanism referred to above.

The water for condensing purposes is taken from the city water pressure and connected to the Water Valve, which is also made a part of the Automatic Valve mechanism. One of the McAlear advantages lies in the fact that all of these connections are controlled and operated by means of the Automatic Valve mechanism and Thermostatic motor, mounted on top of cylinder, as outlined above.

**The Operation.** When the Pump is in operation, steam enters the cylinder through steam valve and forces the air contained therein out through the discharge pipe at the bottom into the water seal trap. After the air is completely discharged from the cylinder, a small amount of steam passes from the cylinder into the water seal trap and from this point it is carried up through a pipe to the Thermostatic Motor chamber causing the Thermostatic disc to expand and open a valve which permits the city water pressure to be exerted on the diaphragms of the steam and water valve simultaneously closing the steam and opening the water valve, thereby admitting water to the cylinder in the form of a SPRAY, condensing the steam or vapor contained therein, producing a vacuum—a very simple, economical and positive method.

**Enormous Reserve Power.** Thus, you see, an exceptionally high vacuum is produced almost instantly—and any experienced engineer will tell you that there is no greater or MORE POSITIVE method of producing a vacuum than by the condensation of steam when it is enclosed in an air tight cylinder such as we use in the manufacture of our pumps. Taking these facts into consideration, also the capacity of our different sizes of pumps, you will readily see that we have an enormous RESERVE POWER on hand to meet any and all emergencies.

**Simple and Effective.** While the water is entering the cylinder in the form of a spray, it is also admitted to the thermostatic motor for the purpose of cooling and reducing the pressure therein. When this is accomplished, the spring above the valve disc will automatically close the water valve.

The vacuum produced by the pump is sufficient at this point to hold the steam valve closed by its passing from the Pump Cylinder through small port holes in the Steam Valve bonnet to under side of diaphragm, holding it in a locked position with the steam and water valves closed.

The valves will remain closed until the vacuum in the cylinder drops to four or five inches, at which point the spring over steam valve diaphragm will release the valve and allow it to open, thereby permitting the steam to again enter the cylinder and drive the air pulled from the system by the previous stroke, out through the discharge at the bottom. After the air is all discharged, steam will again enter the thermostatic motor, closing the steam valve and opening the water valve, allowing the pump to complete another stroke, as hereinbefore outlined.

**The Power Plant.** The Thermostatic Motor is the power plant of the pump—it gets its thermostatic action from the volatilization of a liquid confined in a number of metal discs with flexible walls.

The laws governing the volatilization of liquids are immutable and discs of this construction can always be relied upon to do the same work when operated under the same temperatures. The power produced by the discs is always in direct proportion to the temperatures to which they are subjected. This power is directed in such a manner as to make the upward and downward strokes of the pump POSITIVE and QUICK. Every movement is absolutely controlled by the Thermostatic Motor, insuring a positive action which is absolutely automatic and reliable in every way.

One of the big advantages of the Thermostatic Motor is that it is actuated by temperatures—the hot vapor or steam is brought in contact with the motor, thereby creating sufficient pressure and power to invariably open the Pilot Water Valve, closing the steam valve and opening the water valve simultaneously, permitting the water to enter the cylinder and thermostatic motor at one and the same time, thus causing the condensing of the steam in the cylinder and the cooling of the thermostatic motor, thereby reducing the pressure and allowing the springs to close the valves.

**Steam Power.** The minimum steam pressure required to operate the pump is from one-quarter to one-half pound above the atmosphere. This pressure is only necessary when the pump is discharging. After the pump has produced a vacuum of twelve to fifteen inches and the piping system is reasonably tight, it may be some time before the pump will be called upon to make another stroke.

During this time, the entire heating system, including the boilers (if the plant is operated low-pressure), can be run under a vacuum. The only time that steam pressure is necessary is when the pump is discharging and then a slight pressure above the atmosphere is all that is required.

The Pump will operate on any pressure from one-half pound to a maximum of ten pounds.

**Water Pressure.** The water pressure required for the pump varies from a minimum of ten pounds to a maximum of fifty pounds. If the city water pressure exceeds fifty pounds, there should be placed in the water supply to the pump, a pressure reducing valve to reduce the pressure to below fifty pounds.

A very important characteristic of the McALEAR Automatic Vacuum Pump not to be found in any other apparatus used for the same purpose is the fact that the pump continues to perform its work after the thermostatic motor has closed the steam and water valves. This is accomplished by the large cooling surfaces of the cylinder, which continues to condense any vapor or steam that may remain therein, thereby increasing the vacuum and removing the air from the system long after the pump is apparently out of service.

Another characteristic of the McALEAR Pump is the powerful impulse or pull that each stroke has. This is so noticeable that in starting the plant in the morning, only a few strokes of the pump are necessary to entirely exhaust all the air from the heating system and to circulate steam through the farthest radiators and most remote parts of the plant as quickly as those nearest the pump and boiler. This is due, however, to the enormous capacity and displacement of the McALEAR Pumps. These pumps perform their work on large plants equally as well as on small, as the efficiency increases in proportion as the speed of operation decreases. This is accounted for by the exposed condensing surfaces of the cylinders, which can be readily demonstrated by closing the valve in the air-line connection at the pump, allowing it to make a stroke. When the stroke is completed, you will find that the pump has produced a vacuum of fifteen to eighteen inches and that this vacuum will continue to increase for a period of fifteen to twenty minutes after the steam and water valves are closed and the pump is apparently out of service.

It would be impossible to accomplish this with any other make of pump, as the vacuum produced would almost immediately disappear if the pump was shut down for a period of five or ten minutes. Thus, you will see why we claim such high efficiencies and low cost of operation. There is no other pump manufactured that has the capacity for handling and exhausting air in large volumes from a heating system as the McALEAR Pump. It is absolutely automatic, starting and stopping when needed and performing its work without the aid of outside power. It is the only pump in existence that has for its power plant a thermostatic motor actuated by the temperature of steam and water.

The McALEAR Automatic Vacuum Pump is positive and quick in action, simple and economical, and when in operation, does its work with eighty per cent less power than any other pump handling the same amount of air and doing the same work. It is adaptable to all kinds of steam-heating plants whether they be office buildings, public buildinggs, industrial plants or small residences. If parties interested will only investigate the different vacuum systems of heating now in use, they will be fairly convinced that we have the simplest and most effective vacuum-producing apparatus manufactured for the automatic removal of the air and water from a heating system.

# McAlear System

## The Biggest Forward Step in the Science of Steam Heating

There was a day when a heating system simply consisted of a boiler, pipes and radiators—but that day is gone forever.

So important is the problem of heating homes, stores, factories, and public buildings, that it has attracted to it the best engineering and mechanical brains possible to obtain. Thousands upon thousands of dollars and years of labor have been devoted to solve this most important problem, and as a result wonderful progress has been made.

The old method of selecting a steam heating system entirely on the initial cost basis, regardless of the cost of operation afterwards, has proved so expensive and so unsatisfactory in the results obtained that today although the cost of apparatus for the use of steam heat is greater, the economy in its use more than justifies the increased initial expense.

We will all agree that the hot water was a marked improvement over any previous system, but since the systems of vacuum and vapor heating have been perfected as demonstrated in the McAlear System, the hot water method of heating is rapidly becoming a thing of the past.

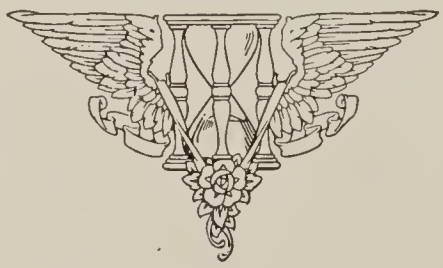
## Vacuum Heating the Perfect System

Since the introduction of the Vacuum and Vapor Systems of heating, and their general adoption by the engineering profession, it has proved to be the best for residences, office buildings, churches, and industrial plants which in former years were equipped with either hot water or steam pressure systems. The fact that eighty-five per cent of such buildings are now being equipped with Vacuum or vapor systems proves beyond a shadow of a doubt that this method of heating is fundamentally correct and has come to stay.

All noted authorities on the science of heating agree that steam inherently affords the best, the most satisfactory, the most elastic and dependable and the most economical method of heating. Here are some facts in regard to the advantages of steam that are indisputable.

The temperature at which steam is given off from boiling water varies in accordance with the boiling point of the water itself. This boiling point varies in accordance with the pressure on its surface. In an open vessel, and at sea level, water will boil at 212° Fahrenheit. Under these conditions, the pressure on the surface of the water is the weight of a column of air one square inch in section, or actually 14.7 pounds above absolute vacuum. An increase in the pressure on the surface of the water raises the temperature of the boiling point, while a decrease in the pressure lowers the temperature. The following table illustrates how these variations take place.

| Pressure (1) | Boiling Temp. Degrees Fahr. (2) | Total Heat above 32° Fahr. B. t. u. (3) | Heat Given off in Condensing B. t. u. (4) | Relative Volume of Water at 39.1°—1 (5) |
|---|---|---|---|---|
| Vacuum in Mercury | | | | |
| 16″ | 175.8 | 1135.8 | 992.0 | 3380 |
| 15″ | 178.8 | 1137.0 | 990.2 | 3163 |
| 14″ | 181.8 | 1138.2 | 988.4 | 2982 |
| 13″ | 184.5 | 1139.4 | 986.8 | 2821 |
| 12″ | 187.2 | 1140.5 | 985.2 | 2677 |
| 11″ | 189.8 | 1141.4 | 983.6 | 2547 |
| 10″ | 192.2 | 1142.3 | 982.0 | 2429 |
| 9″ | 194.5 | 1143.2 | 980.6 | 2321 |
| 8″ | 196.8 | 1144.1 | 979.2 | 2222 |
| 7″ | 198.9 | 1145.4 | 977.9 | 2131 |
| 6″ | 200.9 | 1145.8 | 976.6 | 2047 |
| 5″ | 202.9 | 1146.6 | 975.4 | 1967 |
| 4″ | 204.9 | 1147.2 | 974.2 | 1897 |
| 3″ | 206.7 | 1147.9 | 973.1 | 1820 |
| 2″ | 208.5 | 1148.6 | 971.9 | 1758 |
| 1″ | 210.3 | 1149.3 | 970.7 | 1700 |
| Atmosphere | 212.0 | 1150.0 | 968.7 | 1646 |
| 1 lb. | 215.3 | 1151.2 | 967.6 | 1548 |
| 2 lbs. | 218.5 | 1152.4 | 965.6 | 1460 |
| 3 lbs. | 221.5 | 1153.6 | 963.6 | 1382 |
| 4 lbs. | 224.4 | 1154.6 | 961.8 | 1312 |
| 5 lbs. | 227.1 | 1155.5 | 960.0 | 1249 |
| 6 lbs. | 229.8 | 1156.5 | 958.2 | 1192 |
| 7 lbs. | 232.3 | 1157.4 | 956.6 | 1141 |
| 8 lbs. | 234.8 | 1158.3 | 954.9 | 1084 |
| 9 lbs. | 237.1 | 1159.0 | 953.3 | 1051 |
| 10 lbs. | 239.4 | 1159.8 | 951.8 | 1050 |



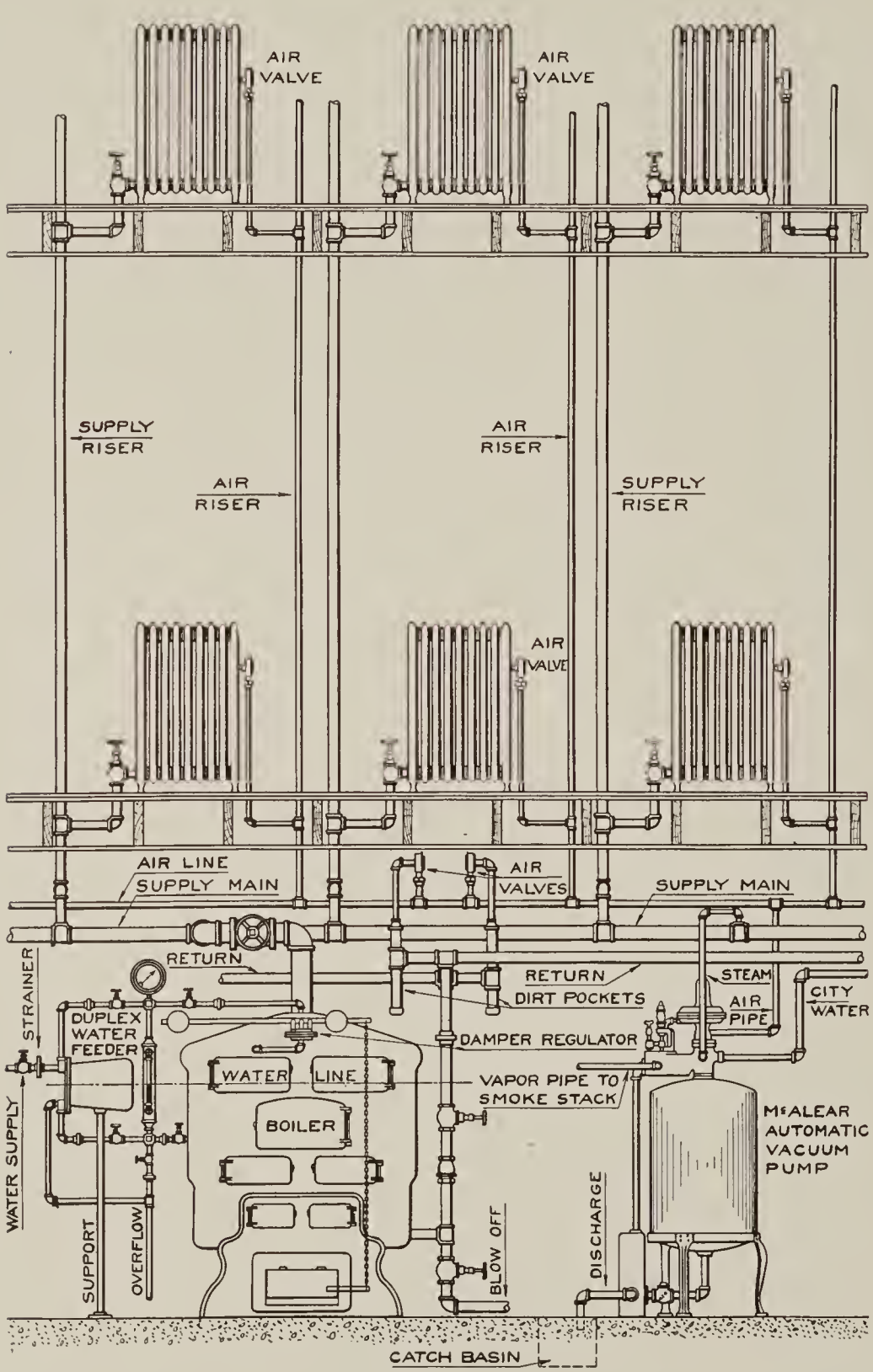
It will readily be seen by a study of columns two (2) and three (3) that water under a vacuum of nine inches will boil at 194.5°, and that the steam generated therefrom contains a total of 1143.2 units of heat. Column four (4) shows the number of units of heat given off by the steam when condensed, the water having a temperature equivalent to the boiling point. It will be further noted from table that, with a 10-pound pressure above atmosphere, water will require 239.4° before it will boil.

This table demonstrates very plainly that steam can be generated (in a vacuum) below 212°, the usual boiling point; and with a McALEAR System this low-pressure steam can be circulated throughout the entire heating plant by means of the McALEAR Automatic Vacuum Pump, which produces a vacuum on the boilers and radiators as well as the air-line, and entire system of supply and return mains.

Therefore, it is readily seen why vacuum heating systems are supplanting hot-water, as steam when used in connection with the McALEAR System can be circulated at about the same temperature as hot water, giving the advantage of quick heating and cooling for the mild weather in spring and fall, which points are decidedly in favor of steam and the McALEAR System.

## Properties of Saturated Steam

| Pressure or Vacuum Pounds per sq. in. | Temperature | Heat of the liquid | Latent Heat | Total Heat | Volume of 1 lb. of steam cubic feet |
|---|---|---|---|---|---|
| —12 | 137 | 105 | 1019 | 1124 | 135 |
| —10 | 160 | 128 | 1003 | 1131 | 78.3 |
| —8 | 175 | 143 | 992 | 1135 | 55.9 |
| —6 | 187 | 155 | 984 | 1139 | 43.6 |
| —4 | 197 | 165 | 977 | 1142 | 35.8 |
| —2 | 205 | 173 | 971 | 1144 | 30.6 |
| 0 | 212 | 180.9 | 965.7 | 1146.6 | 23.36 |
| 1 | 215 | 184 | 964 | 1148 | 25 |
| 2 | 219 | 188 | 961 | 1149 | 23 |
| 3 | 222 | 191 | 959 | 1150 | 22.2 |
| 4 | 224 | 193 | 957 | 1150.5 | 21.2 |
| 5 | 227 | 196 | 955 | 1151 | 20.16 |
| 10 | 239 | 208 | 946 | 1154 | 16.3 |
| 15 | 249 | 218.8 | 939.3 | 1158.1 | 13.7 |
| 20 | 258.7 | 228 | 932.5 | 1161 | 11.85 |
| 25 | 266.7 | 236.2 | 927.1 | 1163.3 | 10.36 |
| 30 | 273.9 | 243.5 | 922 | 1165.5 | 9.34 |
| 35 | 280.5 | 250.2 | 917.3 | 1167.5 | 8.45 |
| 40 | 286.5 | 256.3 | 913 | 1169.3 | 7.73 |
| 45 | 292.2 | 262.1 | 909 | 1171.1 | 7.11 |
| 50 | 297.5 | 267.5 | 905.2 | 1172.7 | 6.61 |
| 55 | 302.4 | 272.6 | 901.6 | 1174.2 | 6.16 |
| 60 | 307.1 | 277.2 | 898.4 | 1175.6 | 5.77 |
| 65 | 311.5 | 281.8 | 895.1 | 1176.9 | 5.43 |
| 70 | 315.8 | 286.1 | 892.1 | 1178.2 | 5.13 |
| 75 | 319.8 | 290.3 | 889.1 | 1179.4 | 4.86 |
| 80 | 323.7 | 294.3 | 886.3 | 1180.6 | 4.63 |
| 85 | 327.4 | 298.1 | 883.6 | 1181.7 | 4.41 |
| 90 | 330.9 | 301.8 | 881 | 1182.8 | 4.20 |
| 95 | 334.4 | 305.4 | 878.5 | 1183.9 | 4.02 |
| 100 | 337.6 | 308.9 | 876 | 1184.9 | 3.83 |
| 110 | 343.9 | 315.4 | 871.4 | 1186.8 | 3.57 |
| 120 | 349.8 | 321.5 | 867.1 | 1188.6 | 3.33 |
| 130 | 355 | 327.5 | 863 | 1190.3 | 3.1 |
| 140 | 360 | 333.5 | 859.1 | 1191.9 | 2.92 |
| 150 | 365.7 | 338.3 | 855.4 | 1193.4 | 2.75 |




Method of installing the McAlear Air Line System of Vacuum Heating where water of condensation is returned to the boiler direct.

## Why the McAlear System is Superior to All Others

In stating that the McAlear System is superior to all others, we are making a pretty strong claim—but we are ready to prove to the satisfaction of any building owner, heating engineer, heating contractor or architect our claim not only in theory but in actual service.

First of all the simplicity of construction, installation and operation will appeal to you. We use the term "System" to designate the combined application of the McAlear Automatic Vacuum Pump, together with all the connections that go with it, also the McAlear Thermo Vent Automatic Air Valves, which comprise a complete method and system of steam circulation.

With the McAlear System vacuum can be maintained on the pump and air lines including the radiators and boiler, if operated at low pressure. This is accomplished by means of the McAlear Automatic Vacuum Pump, which when properly placed and connected, REQUIRES NO ATTENTION ON THE PART OF ANY ONE to keep it in successful operation—a distinct and exclusive McAlear advantage. While the McAlear System has many other advantages, on this one point alone we base our claim and can prove by actual operation that it is SUPERIOR TO ALL OTHERS—because all other systems produce and maintain a vacuum at one point only by means of complicated and sometimes expensive pumps and apparatus which required skilled attention.

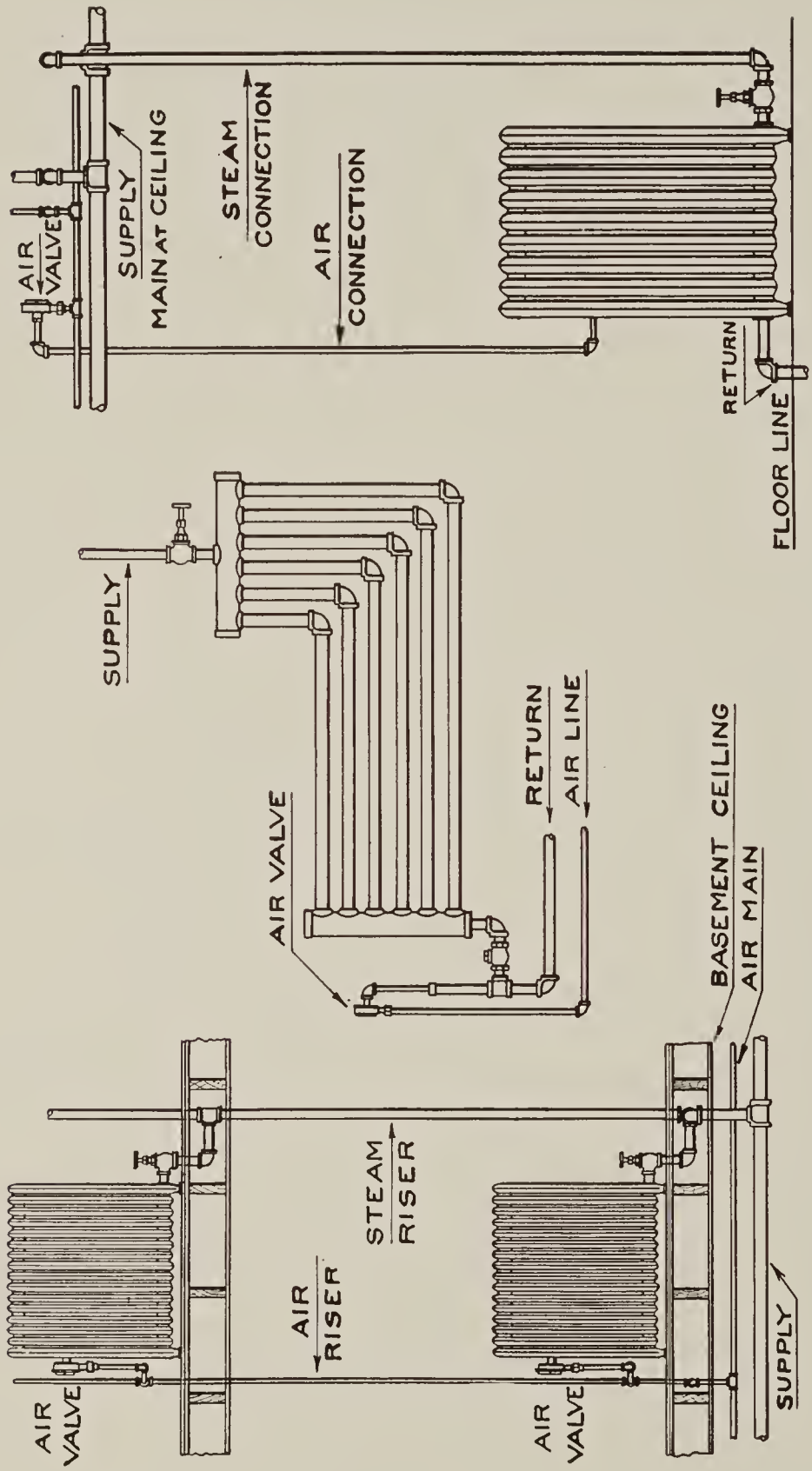
Any practical heating engineer, by a careful study of the McAlear installation, will find that a perfect circulation, control and distribution of steam can be obtained in a MUCH GREATER DEGREE than is possible with any other system. For this one reason alone many heating Engineers and Architects who have made a careful study of the heating problem do not hesitate to give the McAlear System their endorsement and preference.

## Perfect Heat Without Noise, Leakage, Damage or Waste

The McAlear System is preferred for office buildings, hotels, schools, public buildings of various types, and hospitals where absolute quietness is necessary. There is no clicking, rattling, pounding, distracting noises in the radiators—there is no sizzling and leaky valves—no escaping of foul air from the radiators—no escaping steam or water to destroy rugs, carpets, furnishings or decorations.

In considering the McAlear System your particular attention is called to the fact that it works perfectly either with or without temperature regulation, or on a one or two pipe system, making it adaptable and suitable for all classes of buildings and plants—especially apartment buildings and residences, where warm rooms and halls are necessary to satisfy the tenants.

Due to the extreme simplicity of construction, the McAlear System is elastic in application. The proportioning of pumps for a large range of radiation surface is merely a question of using different sizes of pumps of suitable capacity for the services required.




Method of making McAlear Air Line System connections to coils and radiators.

Many of the McAlear Systems are being installed by those who have had experience with hot water and other vacuum systems—especially by those who have learned through costly experience that QUALITY rather than PRICE should determine the selection of a proper heating system. They have learned from experience, too, that quality determines the practicability, the very operation and life of the apparatus, the cost of its upkeep—because the money invested in quality pays the richest dividends in the end.

Notwithstanding the fact that the McAlear System is simplified and standardized, its extreme simplicity and sensitiveness is as efficient and durable as the heating system itself.

## All Back-Pressure Absolutely Eliminated

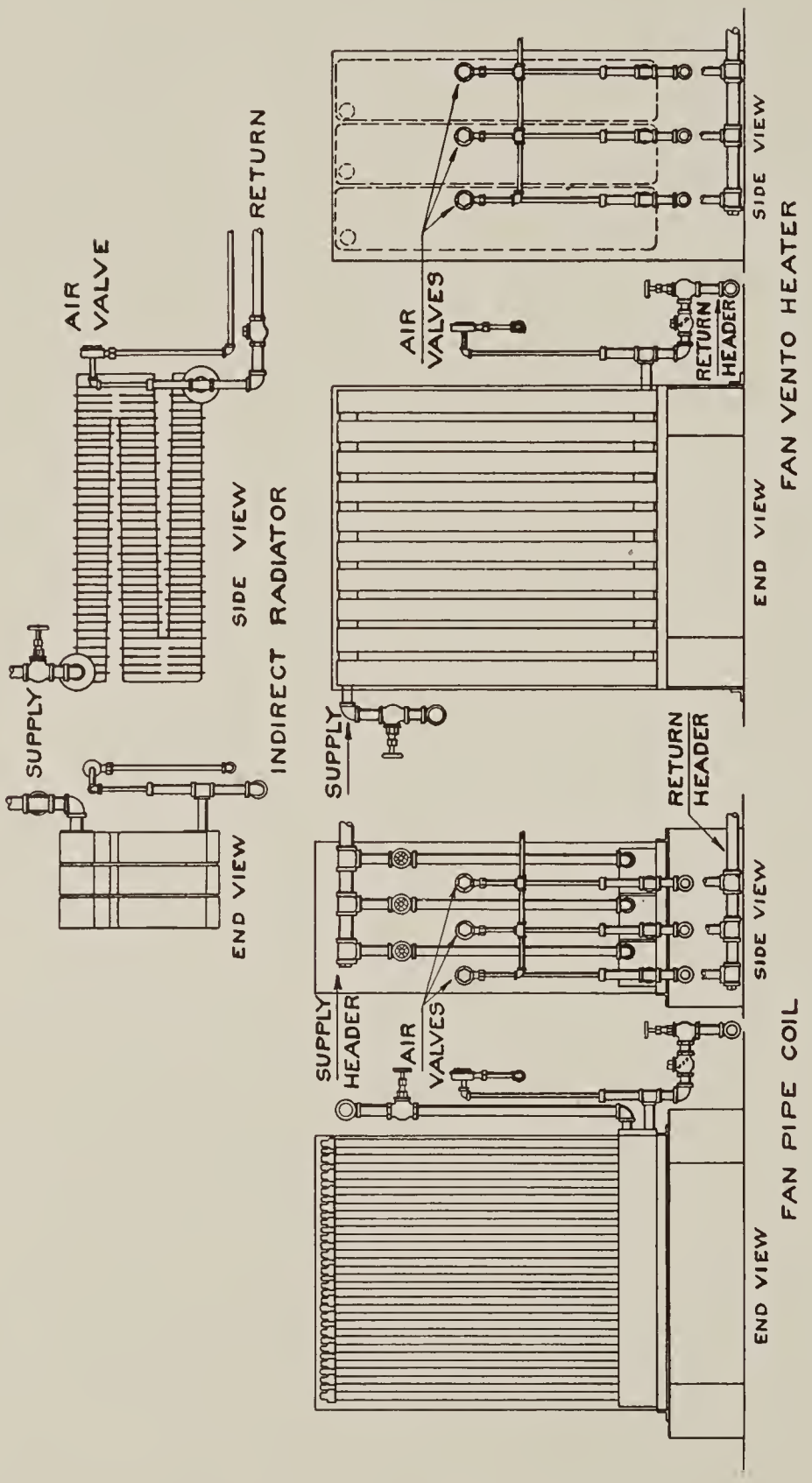
Here is just one of many reasons why you should give our system the preference. When applied to plants using exhaust steam for heating purposes, it enables such plants to circulate exhaust or live steam at a pressure less than that of the atmosphere (by removing all back pressures from engines, pumps, etc.), and by so doing it *lowers the cost of operation* and *increases the efficiency* and power of the engines and pump.

For many years, owners of power plants labored under the delusion that exhaust steam could not be utilized for heating purposes without having to carry excess back pressure on engines to force its circulation. It is only in recent years that its use in connection with heating was given any consideration. Today there is scarcely a power plant operated in connection with the heating of buildings that does not utilize all of its exhaust steam for heating purposes.

Many of the more modern plants, however, are equipped with a vacuum system which enables them to use the exhaust steam without having to carry any excessive back pressure on the engines, because, for instance, the vacuum produced by the McAlear System for the purpose of automatically removing the air and water is sufficient to cause the steam to flow to all points of use without pressure, thus increasing the efficiency of the engines and heating system, also enabling the development of more power with less coal than is possible to obtain where plants are not so equipped.

## Especially Adapted for Buildings Using Steam from a Central Plant

The installation of the McAlear Automatic Vacuum Pump in buildings receiving their heat from a central plant insures a perfect circulation of steam throughout all radiators, regardless of what the pressure may be on the street mains. In proof of this, there are a number of central plants throughout the country using this system in connection with buildings receiving their steam from a central station—in each instance the system is giving perfect satisfaction and the owners and operators speak in the highest terms of the results obtained.




Method of making McAlear Air Line Connections to fan pipe coils, Vento radiation and Indirect cast-iron radiation.

## Capacities and Prices of the McAlear Vacuum Pumps

| Number of Pump | Maximum Capacity in Sq. Ft. of Direct Radiation | Air Displacement of Pump in Cu. In. Per Stroke From No. Vacuum to 27 In. | Contents of Pump Cylinders In Cubic Feet | Steam Consumption of Pumps in Pounds Per Stroke | PRICES |
|---|---|---|---|---|---|
| 1 | 1000 | 6939 | 4.4 | .1672 | $ 200 |
| 2 | 1800 | 9099 | 5.3 | .2014 | 255 |
| 3 | 3000 | 9342 | 6.0 | .2280 | 285 |
| 4 | 4400 | 13932 | 8.8 | .3344 | 320 |
| 5 | 6000 | 15552 | 9.9 | .3762 | 375 |
| 6 | 7800 | 17172 | 11.0 | .4180 | 440 |
| 7 | 9800 | 18792 | 12.0 | .4560 | 505 |
| 8 | 12200 | 20800 | 16.4 | .6232 | 585 |
| 9 | 15200 | 25515 | 18.0 | .6840 | 675 |
| 10 | 19500 | 31239 | 20.1 | .7638 | 775 |
| 11 | 24500 | 33156 | 21.3 | .8094 | 880 |
| 12 | 30000 | 35694 | 22.9 | .8702 | 1000 |

Water consumption of pumps varies from 5 to 8 pounds per stroke, depending on size and amount of vacuum produced.

NOTE—Important.

In determining the proper size pump for the work please read the three paragraphs hereinafter outlined under heading "Basis for Determining the Proper Size Pump for the Work."

We will guarantee the satisfactory operation of our pumps only when connected with the radiation equal to or less than the maximum rated capacities given in the above table.

## Basis for Determining the Proper Size Pump For the Work

If fan coils and direct radiation are used for heating and ventilating and the fan coil surface is given in lineal feet of one-inch pipe, reduce it to square feet and multiply by two, then add the direct radiation if there be any and the total will enable you to determine on the proper size pump.

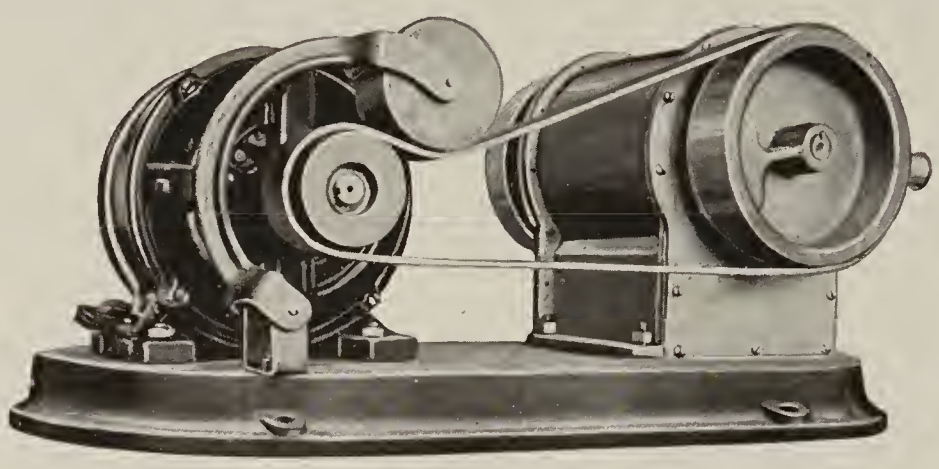
If the fan coil surface is given in square feet of vento radiation, multiply by two and add the square feet of direct radiation, if there be any and the total will enable you to determine on the proper size pump.

If these are no fan coils, then take the square feet of direct radiation. If there is no direct radiation8 take the fan coils or vento on the basis hereinbefore outlined.

## Shipping Weight, Overall Dimensions and Size of Pipe Connections for the McAlear Vacuum Pumps

| No. of Pump | Weight | Height | Width | Steam | Water | Vapor | Discharge | Air Line |
|---|---|---|---|---|---|---|---|---|
| 1 | 280 | 5'3" | 2'0" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 2 | 320 | 5'5" | 2'2" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 3 | 350 | 5'9" | 2'2" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 4 | 420 | 5'9" | 2'6" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 5 | 460 | 6'1" | 2'6" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 6 | 520 | 6'5" | 2'6" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 7 | 550 | 6'8" | 2'6" | 1¼ | ¾ | 1¼ | 2" | 1" |
| 8 | 600 | 6'3" | 3'0" | 1½ | ¾ | 1¼ | 2" | 1" |
| 9 | 640 | 6'7" | 3'0" | 1½ | ¾ | 1¼ | 2" | 1" |
| 10 | 670 | 6'11" | 3'0" | 1½ | ¾ | 1¼ | 2" | 1" |
| 11 | 690 | 8'2" | 3'0" | 1½ | ¾ | 1¼ | 2" | 1" |
| 12 | 770 | 7'8" | 3'0" | 1½ | ¾ | 1¼ | 2" | 1" |

# McAlear Electric Air Line Vacuum Pump



Protected by Patents

## Exclusive Advantages

An important part of our system is the McAlear Electric Air Line Vacuum Pump of an entirely new and improved type of rotary design—with a single propeller which rotates on ball bearings displacing the air with a rolling motion, eliminating all friction and rubbing surfaces. When in operation neither air or water is required to seal these pumps—there are no valves, gears, pistons, or sliding contacts requiring take-up or adjustment.

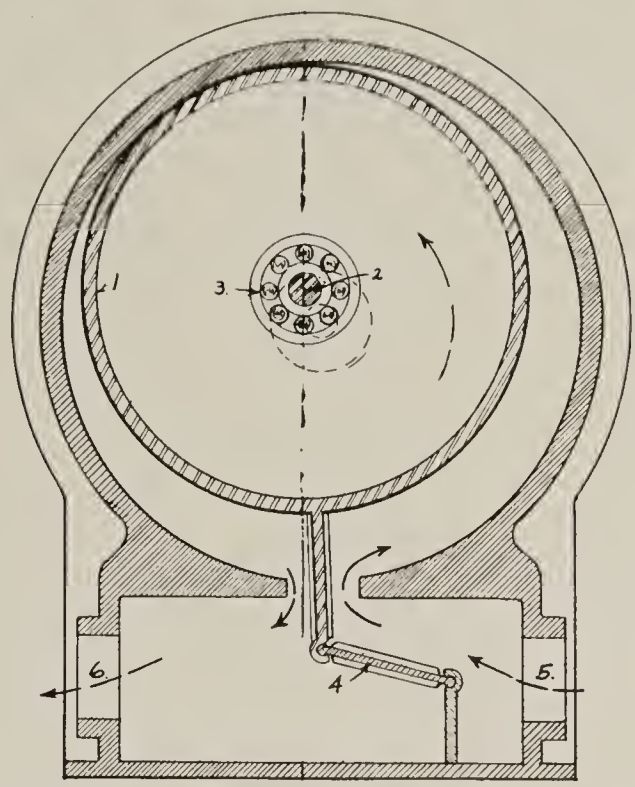
These improved pumps will take care of any water that may be carried back in the air lines—without injury to any of their parts and without impairing their economy and efficiency in any way.

The pump motor and idler come mounted on a heavy cast iron base in the form of one simple and compact unit—the belt is endless, oak tanned and impervious to steam, water or acids. Pump can be operated by either direct or alternating current motors.

We guarantee the satisfactory working of these pumps—each pump is thoroughly tested before leaving our factory—all bearings are carefully lubricated, ready for operation.

No other electric pump is so well adapted for use in connection with air line vacuum heating systems for residence, apartment buildings, hotels, office buildings, schools and other public buildings, including large stores and industrial plants.

The pumps are silent in operation. They are provided with an automatic vacuum controller, so arranged that when the vacuum drops to five inches on the air line, the motor automatically starts the pump and immediately runs the vacuum up to ten inches, at which point the current is automatically cut off and the pump is shut down. The big advantage of this system of control is that you are only using current for short periods. This makes the equipment unusually economical and efficient in operation, because you are not wearing out your equipment by continuous operation—an advantage in economy well worth your serious consideration.




1. Impeller.
2. Crank shaft.
3. Ball bearings.
4. Hinged Wall.
5. Inlet.
6. Discharge.

## Capacities and Prices of the McAlear Electric Air Line Vacuum Pumps

| No. of Pump | Max. Cap. Sq. Ft. Direct Radiation | Horse Power of Motor | Actual Displac't cu. ft. Per Minute | Space Req'd for Pump Inches | List Price | Approx. Shipping Weight |
|---|---|---|---|---|---|---|
| 10 | 4000 | | | 12 x 22 | $353.14 | 300 |
| 11 | 6000 | ¼ | 6 | 12 x 22 | 411.90 | 350 |
| 12 | 10000 | ⅓ | 10 | 12 x 24 | 555.06 | 450 |
| 13 | 20000 | ½ | 20 | 14 x 30 | 891.00 | 550 |
| 14 | 28000 | ¾ | 35 | 14 x 30 | 990.00 | 700 |
| 15 | 35000 | | | 14 x 36 | 1,126.40 | 800 |

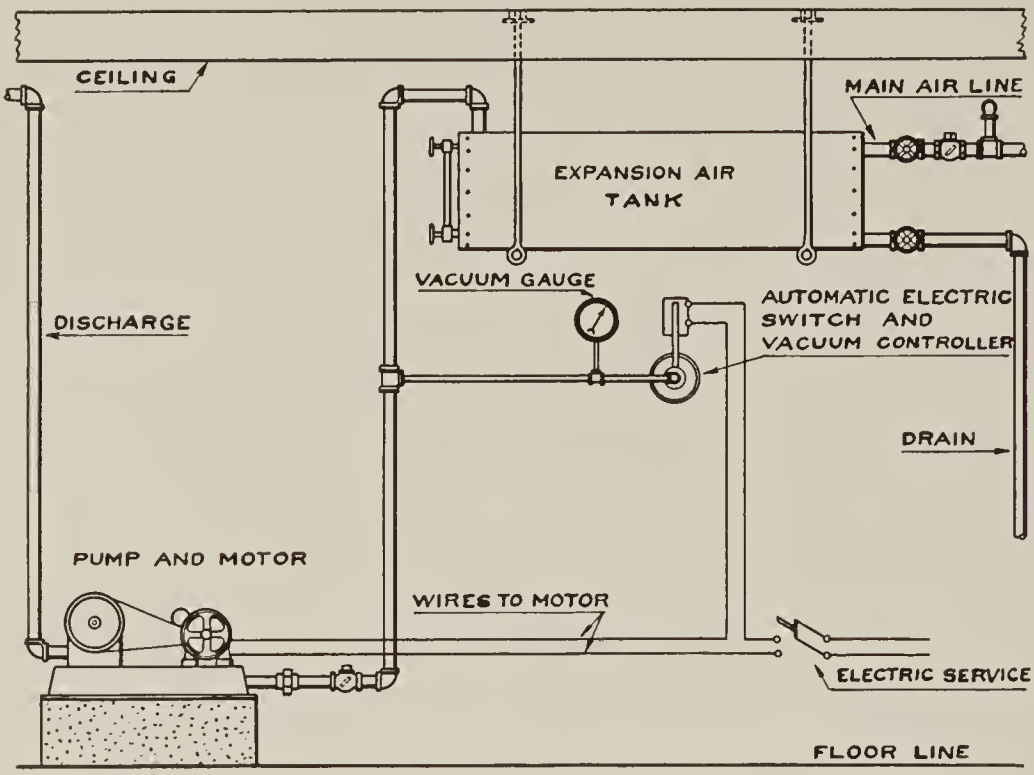
In ordering pumps be sure to state whether the current is direct or alternating, giving the voltage, cycle, and phase.

We will guarantee the satisfactory operation of our pumps only when used in connection with the radiation set opposite each size in the above table. In ordering pumps, please state the amount of radiation in square feet of direct radiation and square feet of blast coil or vento radiation, if there be any. The above capacities are based on square feet of direct radiation only.

In order to determine the size pumps for blast coil work, multiply the square feet of blast coil or vento radiation by two and select a pump suitable for the work.

The above prices include pump and motor complete with sub-base, expansion tank, gauge glass, 3½″ vacuum gauge, automatic electric switch, vacuum controller and check valve in air connection between the expansion tank and pump.

All of the materials delivered f. o. b. cars, Chicago.




# For Old or New Heating Plants

For a description of the air piping system see specifications, on Pages 33 to 35 inclusive.

The McAlear Electric Vacuum Pumps can be installed in connection with old or new heating plants, having what is known as a one or two pipe system. When installed in connection with plants already in operation, the air piping is usually run to correspond to the steam piping and the connections to the radiators are made to an automatic air valve that is usually placed about midway the radiator.

When installing the air piping system, care should be taken to ream out the pipes and see that all joints are made properly and that they are put together with asphaltum so as to make them absolutely air tight.

When the air piping is installed, a test should be made as hereinafter outlined in the air piping specifications, pages 33 to 35 inclusive.

If the air piping is properly installed and will stand the test prescribed, the pump will be able to produce 10 inches of vacuum in 10 or 15 minutes from the time the service switch automatically starts the motor and pump. This vacuum will be sufficient to exhaust the air from the radiators and discharge it to the atmosphere. When the air is all exhausted and the vacuum reaches 10 inches, the automatic electric vacuum controller cuts off the current and shuts the pump down. The pump will remain shut down until the vacuum on the air line drops to five inches, at which point the automatic vacuum controller throws the controlling switch and starts the pump and again brings the vacuum up to 10 inches at which point the current is again cut off and the pump closes down. In operating the pump automatically in this manner it reduces the cost of operation to a minimum, and increases the life of the pump and motor.

The actual cost of operating the pump amounts to only a few cents per day for the electric current used.

# Fourteen Distinct McAlear Advantages

1st—A *positive* and *uniform circulation* of steam throughout the entire heating system AT or BELOW atmospheric pressure.

2nd—*Greatest economy* by utilizing heat of steam at low temperatures.

3rd—Noiseless and safe—will not foul the air in the room, no leakage or dripping from air valves—no possibility of damage to furnishings—guaranteed to be a SEALED SYSTEM.

4th—The independent and positive removal of the air and water of condensation from the heating apparatus.

5th—Continuous satisfactory service always at an exceptionally low maintenance and repair cost.

6th—Saves money because no power is required to operate the modern McAlear Steam Operated Vacuum Pump—simply make connections and the pump does the rest.

7th—Absolutely automatic—no starting or stopping the pump—no valves to open or close—no skilled labor required.

8th—So simply constructed and works with such mechanical precision that there is nothing to get out of order—requires no oiling, attention or pay roll.

9th—Fuel saver because it heats up in LESS THAN HALF THE TIME required by other systems and never "overlooks" a radiator on the line no matter where located.

10th—Saves labor and coal because of the long intervals between firing.

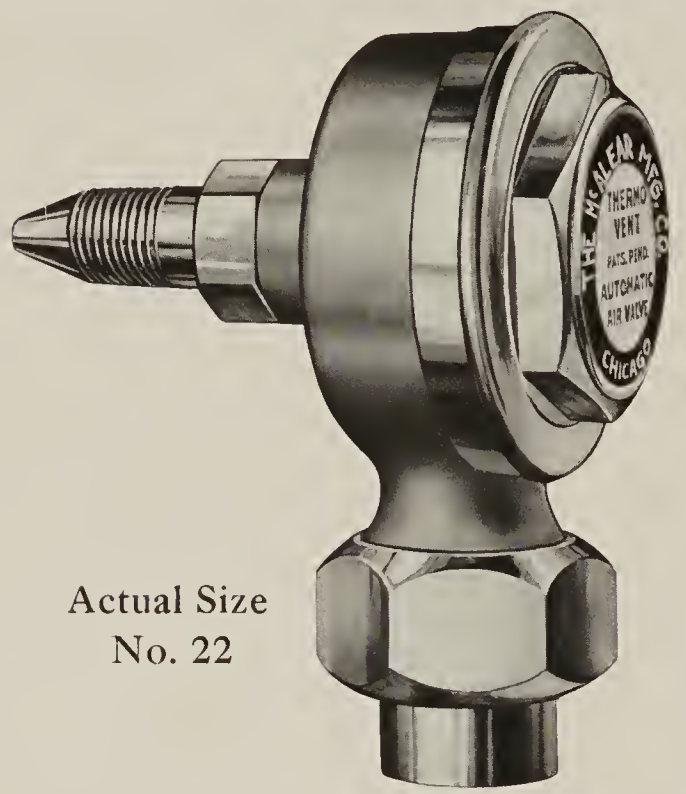
11th—Superior to other "vapor" or "vacuum" systems because it maintains heat during the night better and longer.

12th—Less expense because less steam used, less coal burned to heat a given space—the McAlear System produces heat at the minimum cost.

13th—No royalties charged for the use of the McAlear System.

14th—Iron Clad Guarantee to replace FREE OF CHARGE any defective parts of any materials furnished by us—see page 3.

# McAlear Thermo Vent Automatic Air Valve




Actual Size
No. 22

## No Adjusting — "Fool-proof"

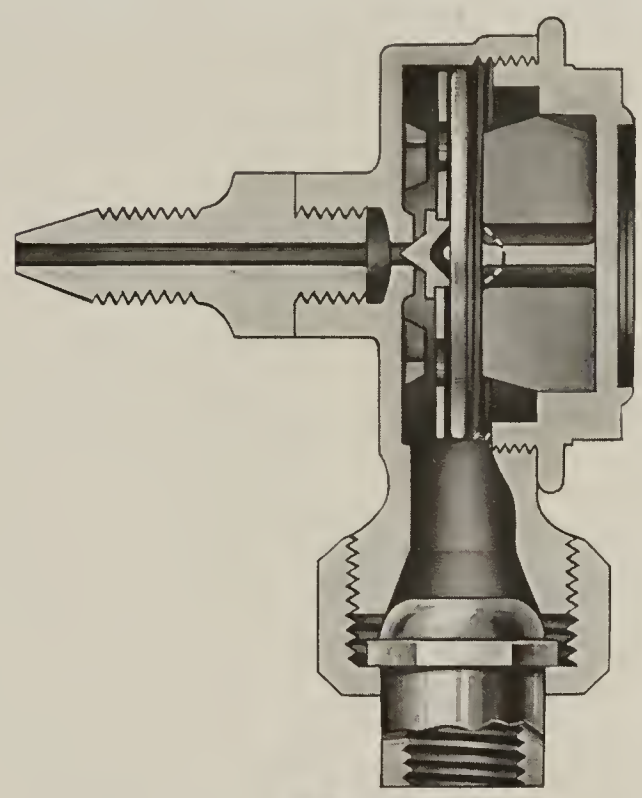
The ¼ x ⅛ inch Thermo Vent Automatic Air Valves are used in connection with the McAlear System of Vacuum Heating or any other air line vacuum or drip pipe work. Because of their design and construction, no adjustment is necessary either at the factory or on the job. This is an important advantage because it insures perfect operation of the system and hot radiators at all times. Contractors and Engineers will appreciate this advantage as it eliminates the trouble and expense so often experienced in having to adjust and put in order the so called "automatic" air valves formerly used for this purpose.

The McAlear Thermo Vent Automatic Air Valves are "fool" proof—they cannot be tampered with or put out of order. Each valve is provided with a movable hex nipple No. 1 so that if one should happen to break when connecting the valve to the air lines and radiators, all the expense incurred to make the valve as good as new would be a few cents for another nipple. The McAlear is superior to all other valves in this respect. If this nipple should break on any other make of valve, the valve would have to be thrown into the scrap heap at a total loss to the purchaser because it could not be repaired.

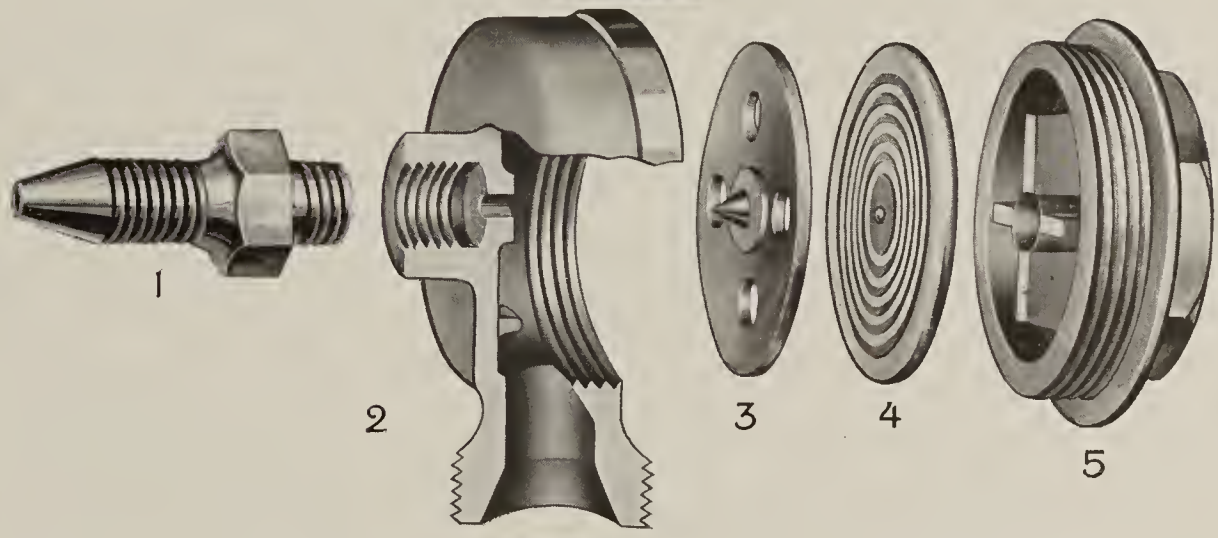
In addition, the McAlear has another decided improvement over all other makes of valves. A hex tail piece No. 6 is used, which enables the steam fitter to screw it on to a pipe with a monkey wrench, thus preserving the nickel plating with no possibility of marring the appearance of the valve.

(For prices see page 29)

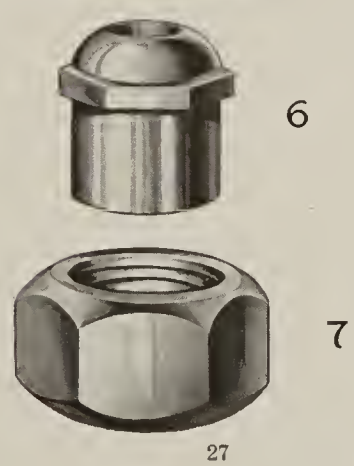
## McAlear Thermo Vent Automatic Air Valve



Actual Size
No. 22



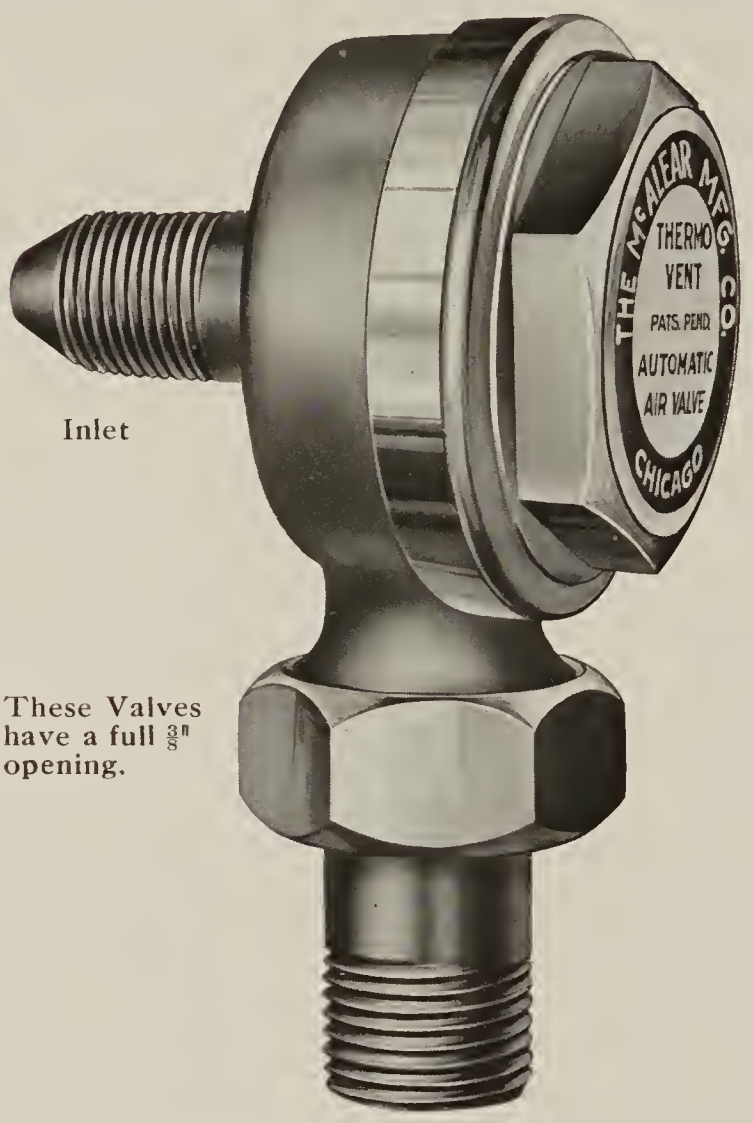

This list of repair parts is suitable for all valves from No. 22 to 36 inclusive, except part No. 1 which is only furnished with No. 22 valve.




LIST OF PARTS

1.—Hex Nipple
2.—Valve Body
3.—Disc Plate
4.—Expansion Disc
5.—Cap
6.—Hex Tail Piece
7.—Union Nut

# McAlear Thermo Vent Automatic Air Valve




Inlet

These Valves have a full $\frac{3}{8}$" opening.

Actual Size
No. 24

This valve is similar in construction to No. 26, except that the part that connects with the radiator or coil is tapped for $\frac{3}{8}$" pipe in place of $\frac{1}{2}$" with union as is the ease with the No. 26. The union, however, in the No. 24 is placed on the discharge side of the valve and the tail piece will be furnished with either male or female thread.

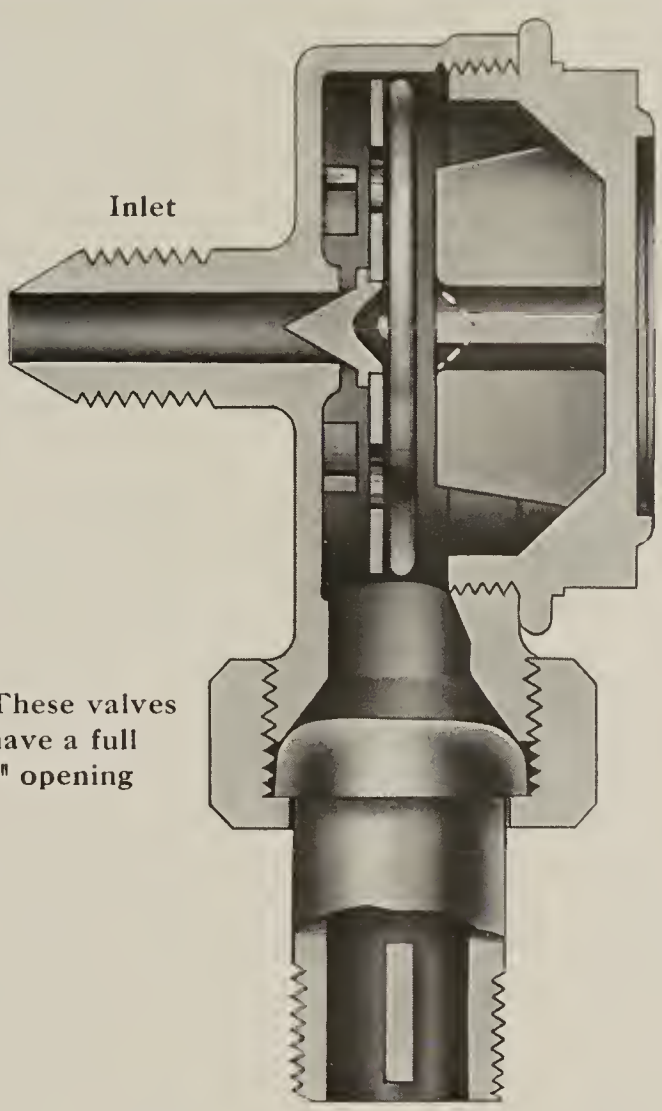
These valves are used for the same or similar purposes as figure No. 26. They are especially suitable, however, for use in connection with Blast Coils, Vento Radiation and relieving mains of air pockets, etc. In fact, any service where a large volume of air is to be removed in the shortest possible time.

The valves are non-adjustable and embody the same principles of construction as those so successfully used in our Thermo Vent Automatic Air Valve, No. 22.

In ordering, state steam pressures and whether for use in conneetion with vaeuum or pressure systems.

For prices, see Page 29.

# McAlear Thermo Vent Automatic Air Valve




The McAlear Thermo Vent Automatic Air Valves are recommended for use in connection with Fan Coils, Vento Radiation and the McAlear System of vacuum heating, as they are necessary to insure its perfect and successful operation.

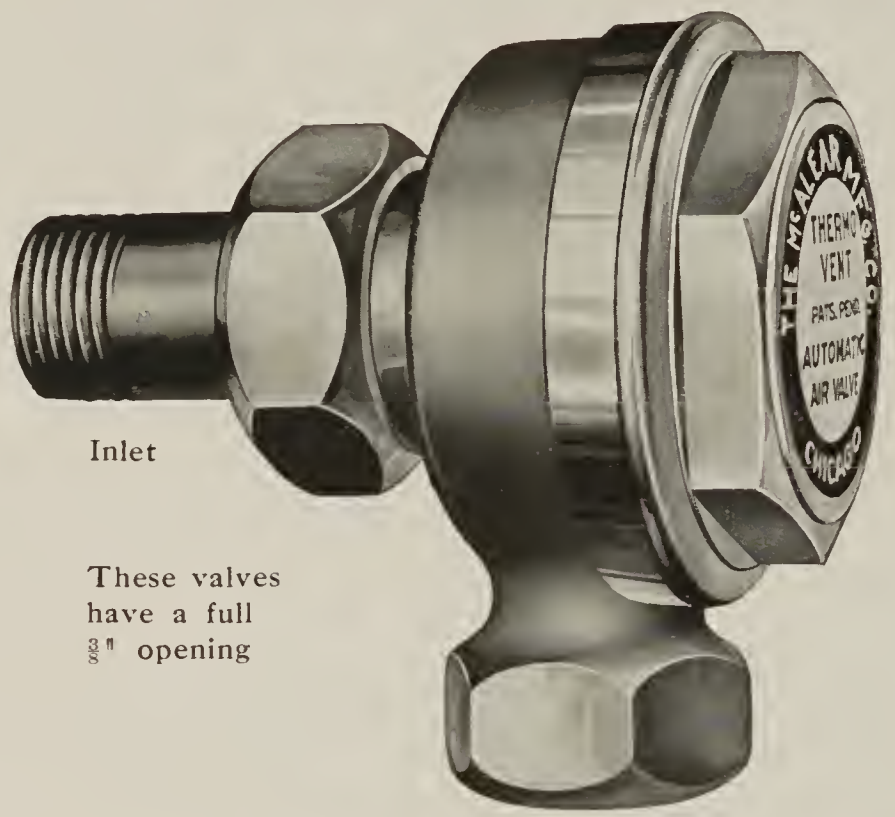
We do not hesitate to unqualifiedly guarantee these valves to be perfect in design, workmanship and material, and to be absolutely automatic and non-adjustable, also to pass air in large quantities and to close absolutely tight against steam, whether used in connection with gravity or vacuum heating systems. It is understood that when these valves are used in connection with gravity or vacuum heating systems they are to be provided with drip pipes.

In ordering, state service and pressures.

| | |
|---|---|
| No. 22, Size 1/4x1/8" | $2.50 each |
| No. 24, Size 3/8x1/2" | 5.00 each |
| No. 26, Size 1/2x1/2" | 6.00 each |

Liberal discounts from above prices will be given to the trade.

## McAlear Thermo Vent Automatic Air Valve




Inlet

These valves have a full $\frac{3}{8}$" opening

Actual Size
No. 26

## Cannot Be Injured by High Steam Temperatures

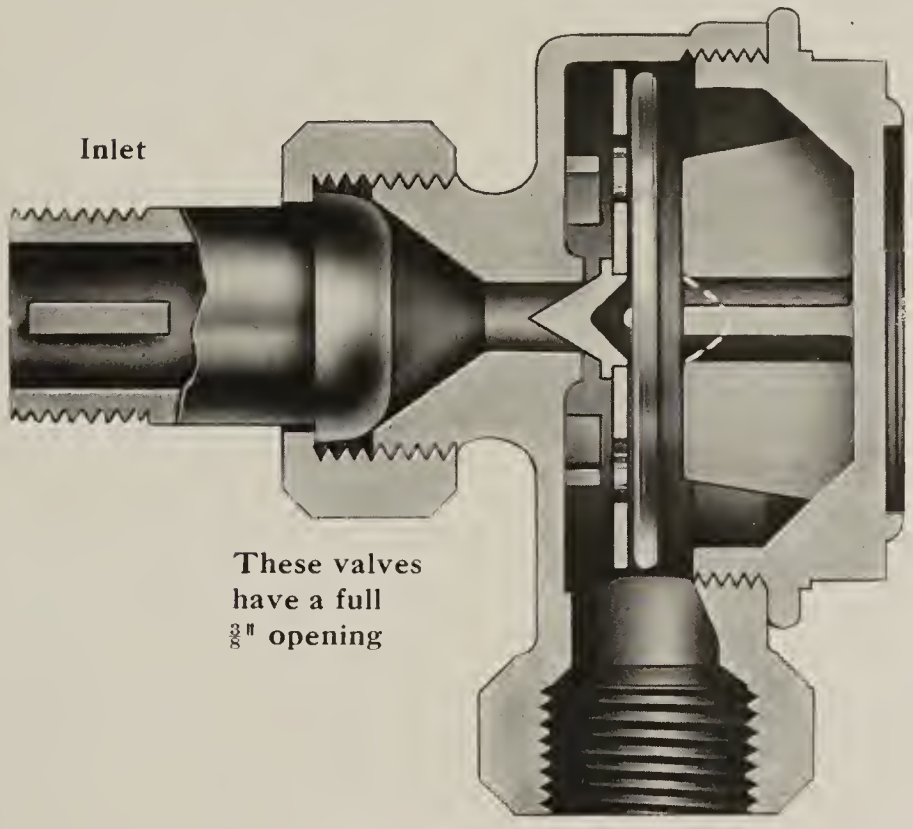
The ½ x ½ inch McAlear Thermo Vent Automatic Air Valve illustrated above is used in connection with vento radiation and fan coil work, or any other work in which a valve must pass large quantities of air in the shortest possible time.

These valves have a full ⅜ inch opening. They can be used in connection with vacuum or gravity work and are also admirably adapted for service in connection with relieving fan coils, vento radiation, supply and return mains of air pockets, etc.

No expense has been spared in the construction of these valves. The best quality of government metal is used—the discs are made of a high grade quality of bronze securely fastened to heavy brass plates, which always retain their shape. The expansion discs are made of phosphor bronze and are charged with a volatile fluid that vaporizes at low temperatures. As an additional safeguard, these discs have a movement four times greater than is actually necessary to close the valve when subjected to the steam temperatures. With this unusually large factor of safety the expansion disc should last indefinitely, especially when you take into consideration the fact that the discs are placed on the discharge side of the valve, thus making it IMPOSSIBLE for the high steam temperatures to injure them in any way—the minute the steam comes in contact with them, they will automatically expand and close the opening through which the steam enters the chamber in which the discs are placed.

(For Prices see Page 29)

# McAlear Thermo Vent Automatic Air Valve




Actual Size
No. 26

## Self Cleaning — Self Protecting

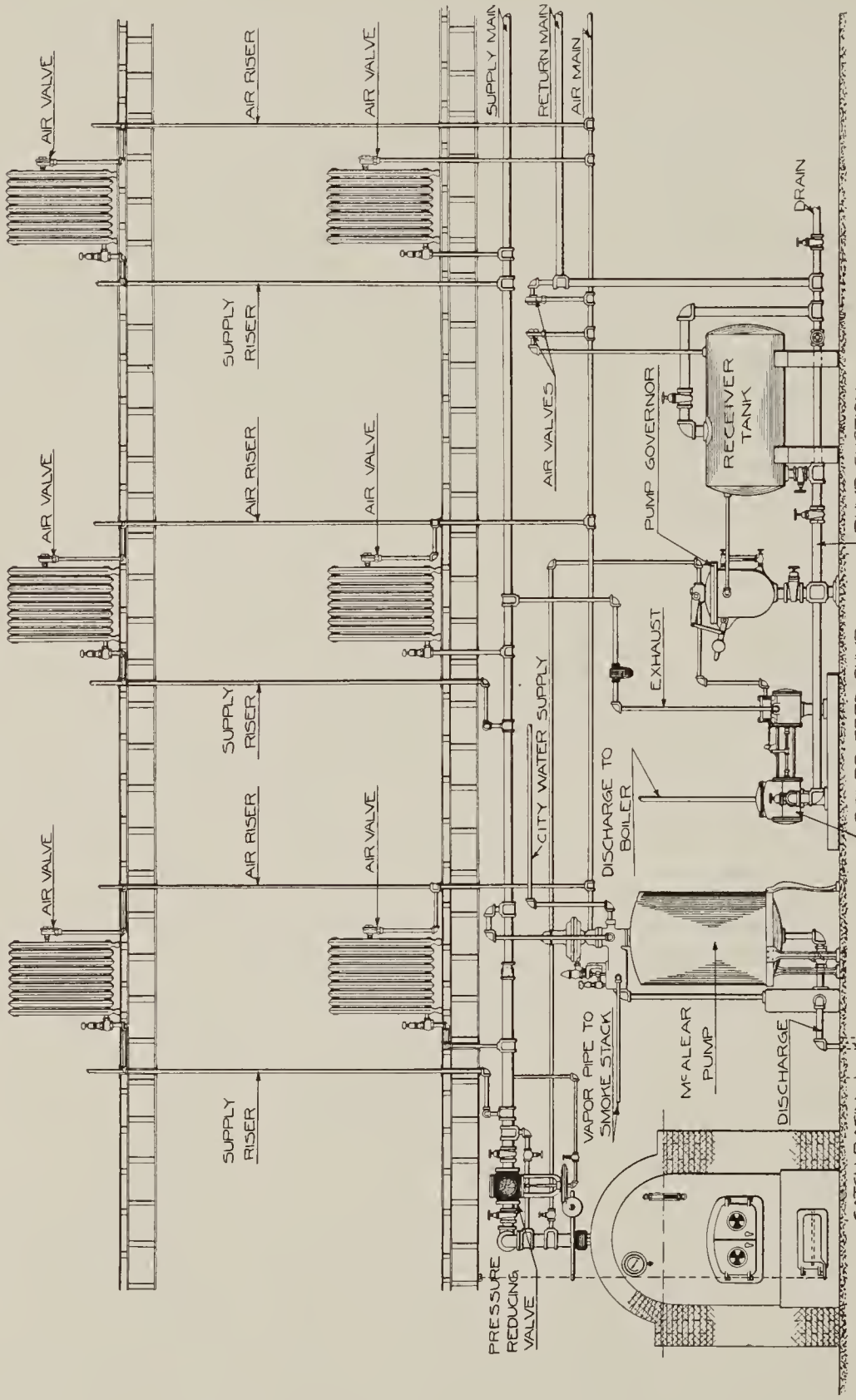
The McAlear Thermo Vent Automatic Air Valves are the result of years of experience and represent the highest degree of engineering and inventive efficiency. They never require any adjustments and are sealed so that it is impossible for anyone to tamper with them in any way. They are positive in action and absolutely noiseless in operation.

The non-adjustable advantage is worthy of your serious consideration because it relieves the contractor of the responsibility, trouble and expense of adjusting the valves after they are in operation. **This means a worth while saving in money, time and labor to the contractor, as well as the owner—and it also insures perfect service—a perfect circulation of steam and is a guarantee of hot radiators at all times under any and all conditions.**

These McAlear Air Valves are also self-cleaning and the expansion discs are self-protecting. We furnish these valves for use in connection with high pressure steam plants as well as for low pressure vacuum heating systems.

In ordering valves for high pressure steam service, always state the initial pressures as we furnish special discs suitable for any pressure up to and including 100 pounds. Therefore, clearly state the service and pressure that the valve is to operate in connection with.

(For Prices see Page 29)




Application of the McAlear Vacuum Pump and Air Line System of Vacuum Heating used in connection with high pressure boilers.

# Specifications for the Installation of the McAlear Air Line Vacuum System of Heating

Furnish and install the necessary air piping and apparatus for equipping the entire plant with the McAlear System of Positive Steam Circulation, supplying all the necessary air valves, vacuum pump, piping, etc., complete, as hereinafter specified.

## Air Piping System for Direct Radiation

From the automatic air valves on all radiators and coils, run quarter inch connections and tie into ⅜-inch horizontal arms which are placed and connected to ½-inch risers run to correspond with the steam risers. These risers are continued to basement and there connected with one-inch mains, which are run to correspond with the steam mains, (the air mains to be divided into the same number of circuits as the steam mains) and graded so that they will drain towards the pump. The 1-inch mains to be connected to the McAlear Automatic Vacuum Pump located where shown on plans or where directed by the engineer or architect, as hereinafter specified.

Place cut off valves in all branch mains and in each circuit where they connect with the Vacuum Pump, so that any one or all can be cut out of service if desired.

## Air Piping System for Fan Coil Work

From the automatic air valves on each section of the fan coils, run ½-inch connections and tie into 1-inch mains run on ceiling of basement (as shown on plans or as directed) to the vacuum pump and there connect them to 1¼-inch header supported in the proper manner to receive all air mains connections, etc., including the mains from the direct radiation system.

Place in ½-inch connections to each air valve on fan coils, cut off valves, so that any section can be cut out of service without interfering with the balance of the system if desired.

Also place, where directed, in each branch main to reheating and tempering coils, cut off valves. All piping from air valves must be graded, so that it will drain towards the vacuum pump and the air valves must be so placed that they will drain either into the coils or radiators with which they connect, or into the air mains. Place cut off valves in the air mains at pump so that any section of the air piping system can be cut off from that point.

## Automatic Air Valves

Furnish and place on each radiator and coil, one Thermo Vent Automatic Air Valve, size ⅛x¼ and connect same as above specified.

Also furnish and place on each section of the fan coils, one ⅜x½ or ½x½-inch Thermo Vent Automatic Air Valve and connect same as above specified.

These valves are non-adjustable, therefore, it will not be necessary for the contractor to figure on adjusting them after the job is put in operation.

## Valves

All valves used in connection with the air piping system and other connections around pump, must be of the straight-way pattern and thoroughly packed with a good quality of moulded packing, so that they will be absolutely tight when in service, valves to be equal to those manufactured by the Chapman Valve Company or Crane's best.

## Fittings

All fittings used in connection with the Vacuum System, shall be best quality of gray east iron, heavy pattern with clean cut threads.

## Pipes

All piping used in connection with the Vacuum System shall be of a good quality of wrought galvanized iron. All piping to be carefully reamed out and must have clean cut threads; joints to be put together with asphaltum (the asphaltum to be placed on the pipe threads and not in the fittings) and when complete, must stand a pressure test of forty pounds per square inch, throughout the entire system. Test to be made with air or water in the presence of a representative of the Architect or the Vacuum Company, as hereinafter specified.

## Test

In making test, cap all connections to air valves and make sure that all cut off valves throughout the entire system of air piping are wide open, then turn into the system, either air or water under a pressure of forty pounds to the square inch. Where directed, place pressure gauges at the ends of the long runs for the purpose of determining the pressure at these points.

If leaks are found, they must be properly marked and repaired and after repairing, if in the judgment of the engineer or representative of the Vacuum Company, a second test is necessary, the contractor must make same and demonstrate to the satisfaction of all parties concerned, that the system of piping is absolutely tight and will hold the pressure hereinbefore referred to indefinitely without any perceptible drop.

## Vacuum Pump

Furnish and place where shown or directed, one McAlear Automatic Vacuum Pump of suitable capacity for handling ——— square feet of direct radiation and ——— lineal feet of fan coils. Make all the necessary steam, water and air connections to pump as directed and as required by the manufacturers, placing in all connections, the necessary cut off and check valves.

## Connections to Vacuum Pump

**Steam connections to pump** must be taken direct from the boiler header through a Kieley 98 pressure reducing valve if the steam pressure exceeds 10 pounds. If less than 10 pounds a reducing valve will not be required. If a reducing pressure valve is used place it in the steam connection at or near the boiler and arranged with by-pass and cut off valves, so that the valve can be removed for repairs.

The steam supply pipe from the pressure reducing valve to pump to be one size larger than that called for by the pump, and at a point near the

pump reduced to the proper size and provided with cut off valve and steam gauge of the size hereinafter specified.

**Water connections to pump** to be taken from City water supply and run one size larger than that called for to pump. If the City water pressure exceeds fifty pounds, place in the connection at or near the pump, a Kieley water pressure reducing valve and regulate same to maintain a pressure not to exceed fifty pounds on pump connection. Place in the water connection at or near the pump, cut off valve and pressure gauge.

**Air connection to pump** to be made in the manner indicated on blue print accompanying pump. The directions and instructions given on blue print must be followed carefully and all connections must be made in accordance therewith. Place in air connections at or near the pump, cut off valve and vacuum gauge.

**Discharge from pump** to be connected with sewer or catch basin of the size called for, making sure that there is no back pressure from the sewer and that the discharge is free and open to the atmosphere. There must not be any trap or seal in the sewer connection beyond where the discharge from pump is connected.

## Steam Pressure Reducing Valve

Furnish and install where directed, one 2½″ Kieley 98, special reducing valve. This valve to be arranged with by-pass as hereinbefore specified, and regulated so as to maintain one pound steam pressure on pump. This valve is only necessary where the steam pressure exceeds 10 pounds.

## Water Pressure Reducing Valve

Furnish and place in water supply to pump, when City pressure exceeds fifty pounds one 1″ Kieley water reducing valve and regulate same to maintain a pressure not to exceed fifty pounds on the pump supply.

## Gauges

Furnish with vacuum system one 3½″ Vacuum gauge, and one 3½″ Steam pressure gauge, all gauges to be furnished by the manufacturers of the Vacuum System, but must be installed in place by the contractor as hereinbefore specified.

## Instructions

Engineer's bulletin and drawings showing how the pump and Vacuum System is installed and operates, must accompany the pump and the instructions given therein, must be followed carefully by the contractor installing the work.

The instructions to be given the engineer after the plant is completed and in operation and the instructions thereon must be carefully followed by the operating engineer.

## Painting

Paint all vacuum piping, connections, fittings, etc., with two coats of asphaltum. Painting to be done when the plant is in operation and a vacuum is on the system.

# Sparks Automatic Vacuum Pump

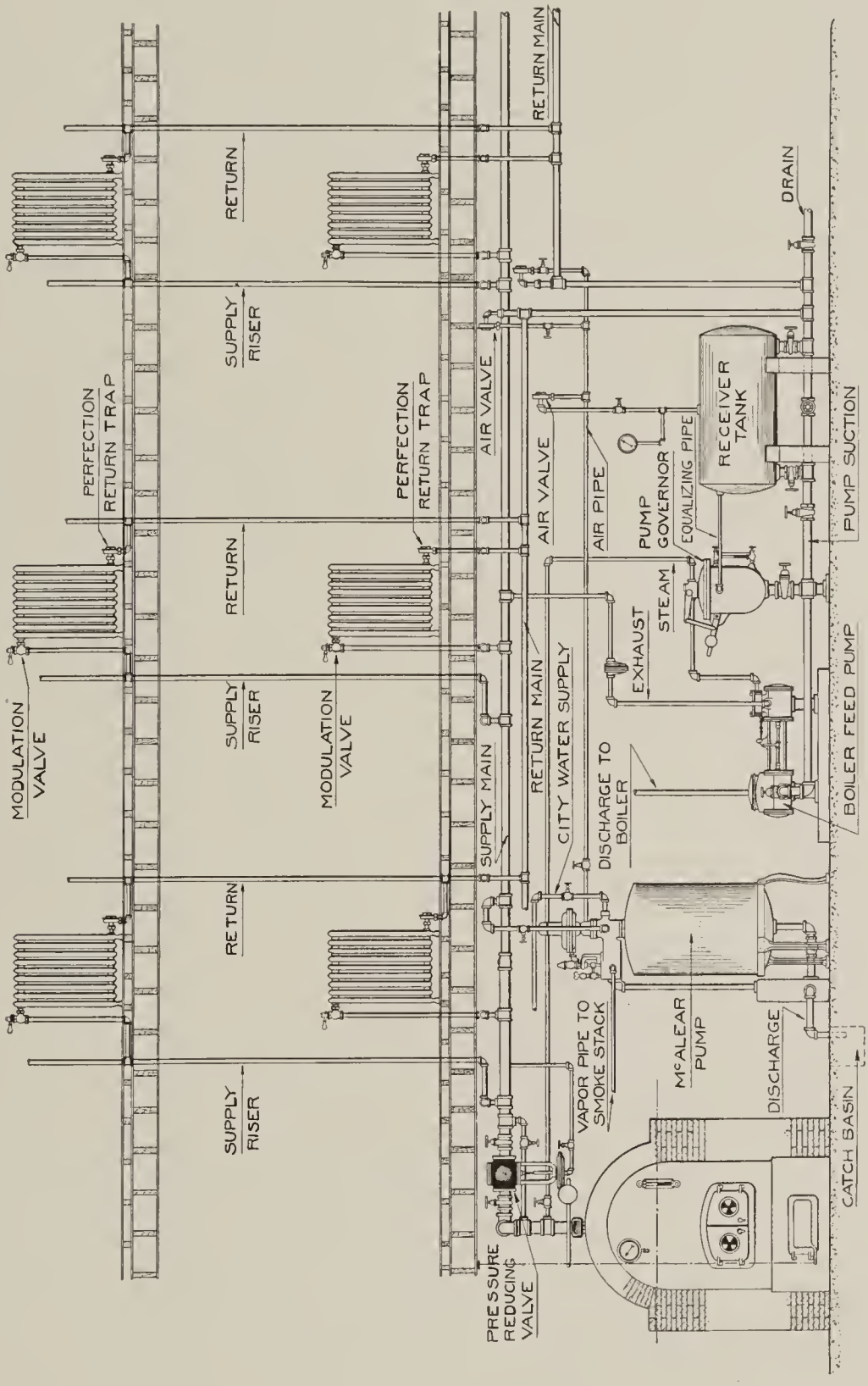
(Patented and Patents Pending)

## Automatic Vacuum Pump Company now changed to The McAlear Manufacturing Company.

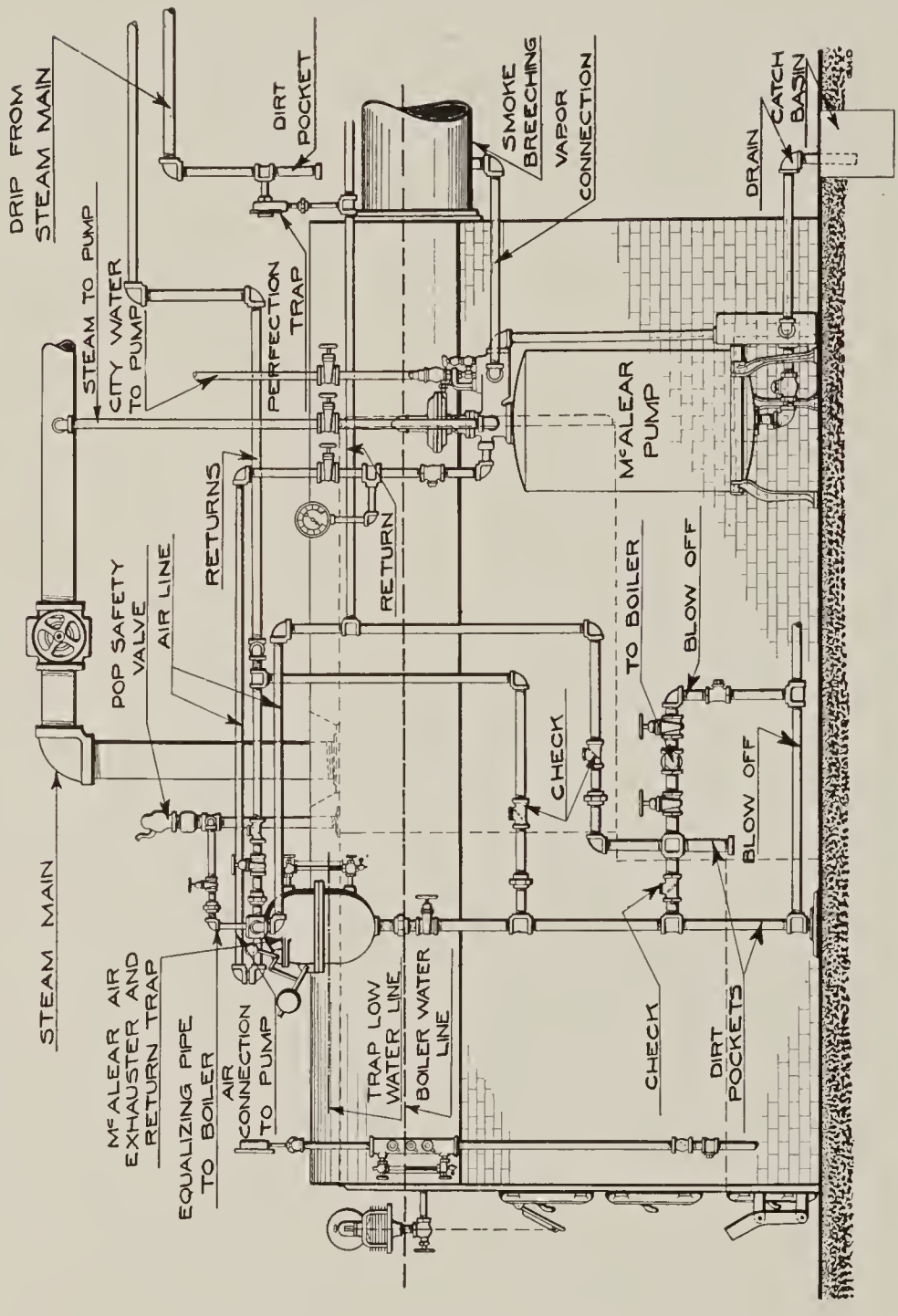
The personnel of our Company has not been changed in any way—but we have made several changes and decided improvements in our line of pumps and vacuum heating specialties, hereafter to be known as the "McAlear System" and specialties.

We will manufacture and can furnish promptly to any one desiring same, Sparks Pumps of the type illustrated above, also repairs and renewals for all of the different style Sparks Pumps now in use.

The improved McAlear line of Pumps are so much better than the Sparks (heretofore manufactured by the Automatic Vacuum Pump Co.) that we do not hesitate to urge all owners of Sparks Pumps to convert them into McAlear Pumps, which can be easily done by removing the Sparks Pump Head and installing in its place the McAlear Pump Head. To make this change we will furnish drawings showing how to do the work, together with a price covering the cost of the necessary material. In the McAlear type of pump there are no adjustments or levers of any kind to get out of order or that will require attention—the possibility of trouble has been entirely eliminated.




Application of the McAlear Vacuum Pump and two pipe vacuum system of heating.




Application of the McAlear two pipe system of vacuum heating returning the water of condensation direct to the boiler and discharging the air to the atmosphere by means of the McAlear return trap and vacuum pump.

# McAlear Two Pipe Vacuum System of Heating

The illustration on page 38 shows a typical installation of a McAlear Two Pipe Vacuum System of Heating, returning the water condensation direct to the boiler by means of the improved McAlear Air Exhauster and Return Trap, discharging the air taken from the system by means of the McAlear Pump into the smoke breeching.

With this equipment the McAlear Pump pulls a vacuum on the return trap—the return mains thereby pulling the water of condensation and air from the entire system back to the trap, separating the air from the water in the trap—discharging the air to the atmosphere and the water into the boiler.

When the trap fills with water, the float automatically opens the valve in the steam equalizing pipe—this equalizes the pressure on the trap and at the same time closes the vacuum connection to the trap, thereby allowing the water to be discharged into the boiler. After the water is discharged, the trap automatically closes the valve in the equalizing pipe and opens the valve in the vacuum connection, again allowing the vacuum produced by the McAlear pump to pull the air and water from the heating system back into the trap. Each action being simple, positive and quick.

The big advantage of this entire equipment is that it is absolutely automatic, positive and dependable in operation. If connected in the manner indicated, it will enable you to operate any return line vacuum system of heating, low pressure gravity or otherwise, with the same degree of efficiency and economy as though high pressure steam driven pumps were employed to produce the vacuum and return the water of condensation to the boiler—but at a *much lower operating and maintenance expense.*

This improved system can be operated equally satisfactorily with a maximum steam pressure of half a pound or any pressure above half a pound. It is not necessary that the boiler pressure be the same as the pressure on the heating system. The boilers can be run high pressure and a reducing valve installed in the heating main to reduce the steam for heating purposes to any low pressure desired.

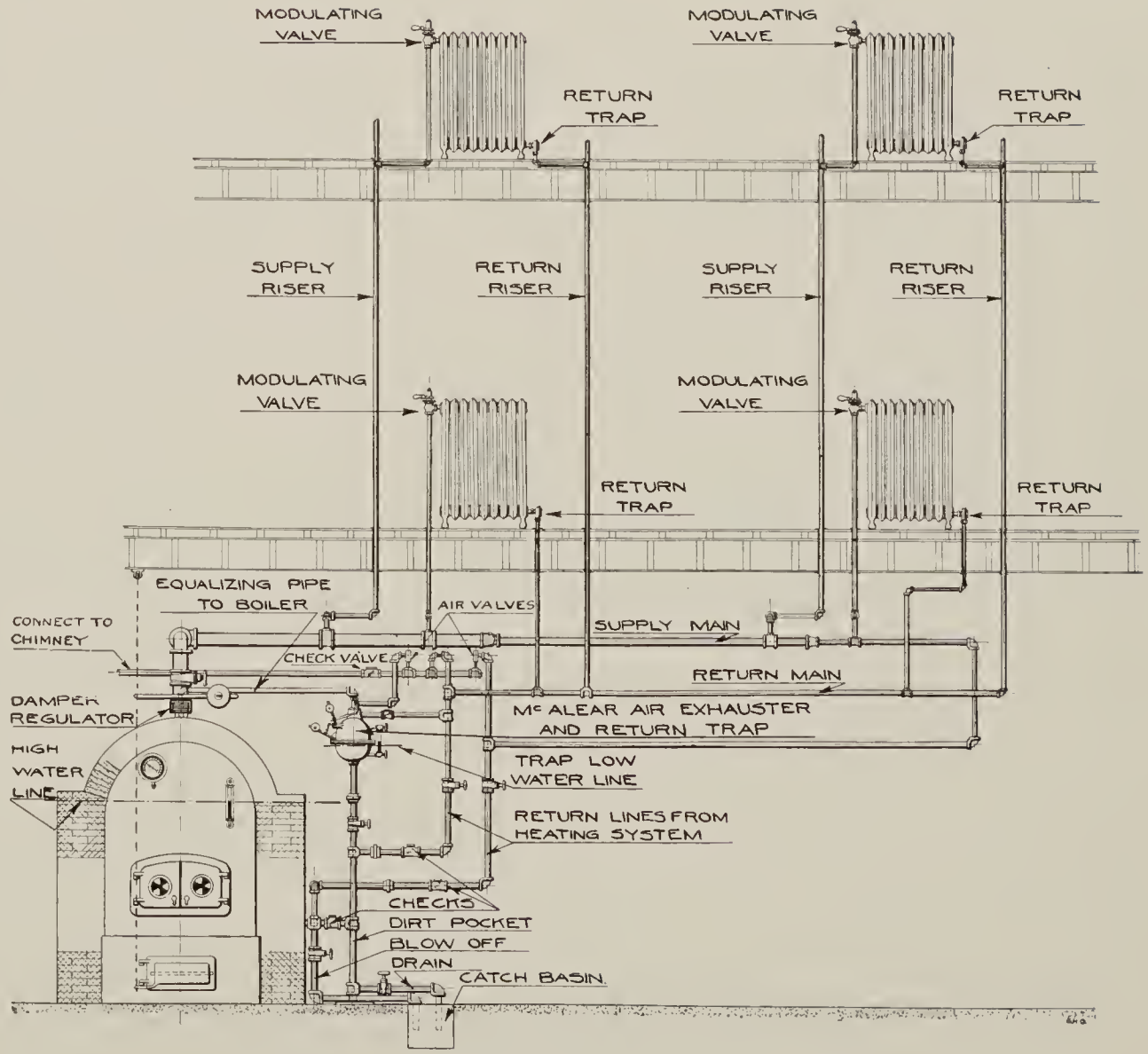
The improved McAlear Pump is extremely flexible—it can be operated on a half pound steam pressure—the McAlear Air Exhauster and Return Trap will operate on any pressure from half a pound to 100 pounds or higher, if desired.

The problem of successfully eliminating air and returning water of condensation from heating systems to boilers has been a troublesome one and one which commands considerable attention of the engineering profession and others who have had experience with heating systems. There has been a great many different kinds of appliances used in attempting to accomplish the desired result, but it remained for the McAlear System to successfully solve the problem—we are confident that no other system is so reliable and positive in operation. This you can prove to yourself by a study of our different systems and appliances—indisputable evidence that we are able to successfully handle air and water in any quantity from heating systems in a very positive, reliable, efficient and economical manner.

Application drawing showing the manner of installing the McAlear vapor system of heating returning the water of condensation direct to the boiler and discharging the air exhausted from the system direct to the atmosphere or to the smoke stack.

With the system arranged in the manner indicated, the water of condensation can go direct to the boiler or through the McAlear Air Exhauster and return trap. When the pressure on the boiler is high, the water of condensation is returned through the trap and when the pressure is low, the water of condensation returns to the boiler direct. The air passes off to the chimney through the trap and vent pipe.






Application of the McAlear Vapor system of heating.

# McAlear Vapor System of Heating

The application drawing on opposite page shows a typical installation of the McAlear Vapor System of heating returning the water of condensation from the heating system to the boiler automatically by means of the McAlear Air Exhauster and Return Trap. The Air Exhausted from the system is discharged into chimney through vent pipe.

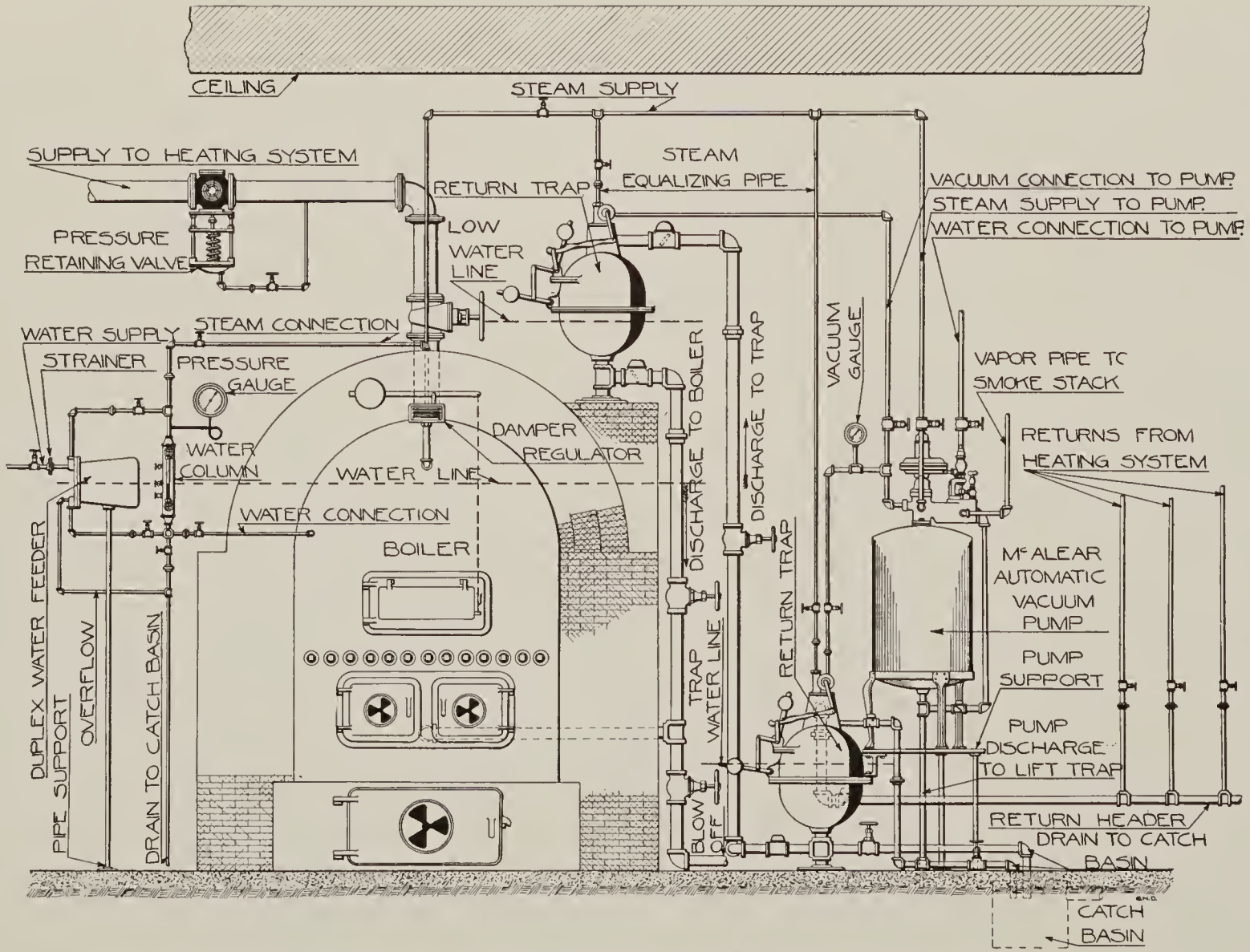
With the system arranged in this manner, the water from the heating system is returned to the boiler direct or through the McAlear return trap, and the condensation from the mains is returned to the boiler without the aid of the McAlear Return Trap, if so desired. The equipment is very simple, positive, reliable and automatic in operation, requiring no attention on the part of anyone as there are no parts to be oiled or adjusted.

The McAlear Air Exhauster and Return Trap when connected up in the manner indicated operates only when the boiler pressure is too high to permit the condensation from the heating system to return direct by gravity. This pressure depends entirely on the distance between the water line in the return trap and the water line in the boiler. These traps are constructed to operate on a difference of 6 inches to 8 inches in the water line. That is, the water line in trap can be placed at a minimum of 6 inches above water line of the boiler. A greater distance than this, however, if it can be had, will do no harm. In fact, the greater the distance between the two water lines, the less work the trap will be called upon to perform.

When the pressure on the boiler is too high for the water to return direct by gravity, it will be forced over into the trap and when the float raises sufficiently to trip the valve mechanism, it will equalize the pressure in the trap with that of the boiler and at the same time close air vent outlet, allowing the water contained in trap to run into the boiler. When the water is all discharged from trap, the float reverses the valve mechanism closing the equalizing valve and opening the air vent valve again allowing the trap to fill with water of condensation.

Cut off valves and check valves should be placed in the connections as indicated and air vent from trap should be connected to smokestack.

With the McAlear system of vapor heating, you will be able to control each radiator independently of the other by setting the McAlear graduated valve to heat any portion of the radiator desired and by using the McAlear Perfection Radiator Trap on the returns from each radiator, you will be able to absolutely control the amount of heat given off as the Perfection Radiator Trap acts as a check and prevents the atmospheric pressure from forcing air into the radiator and system, thereby keeping each radiator unit, and, in fact, the entire system, in the best possible condition to circulate and receive steam. With the McAlear system you can bring into use every square inch of heating surface as a heat distributor or you can control it to maintain the required temperature by allowing the steam to enter just enough of the radiating surface to do the work in a satisfactory and economical manner. In other words, the system is so flexible that it can be adjusted and operated to meet any condition from a minimum to a maximum which must mean economy and efficiency, all of which we are striving to get in heating and power equipments.




Application drawing showing the manner of returning water of condensation from a McAlear two pipe vacuum system of heating direct to the boiler, the McAlear Vacuum Pump pulling a vacuum on both traps and discharging the air exhausted from the system direct to the atmosphere.

# McAlear Two-pipe Vacuum System of Heating

The line drawing on page 42 shows a typical system of returning water from a vacuum heating system to the boiler automatically by means of the McAlear Return Traps and Vacuum Pump discharging the air exhausted from the system directly to the atmosphere or smoke stack.

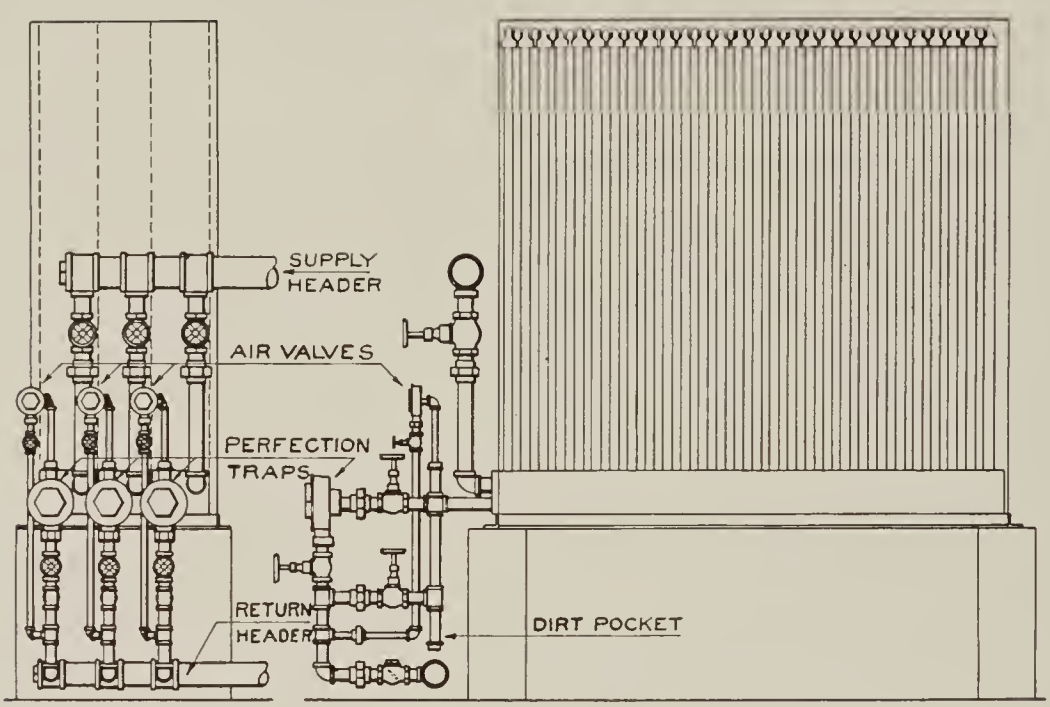
This system is especially adapted for use in connection with Vacuum Heating where the returns are below the water line of the boiler. By placing a return trap on the boiler room floor and one on the top of the boiler as indicated, connecting them up to the boiler pressure and to the McAlear Air Pump, the water of condensation is pulled back to the lower trap by means of the vacuum produced by the pump and when the float operates the valve mechanism and opens the valve in the equalizing connection, the boiler pressure forces the water from the lower trap up into the one on top of the boiler. When this trap operates, it discharges water directly into the boiler by equalizing the steam pressure on the trap.

The entire system as arranged is absolutely reliable and efficient in every way.

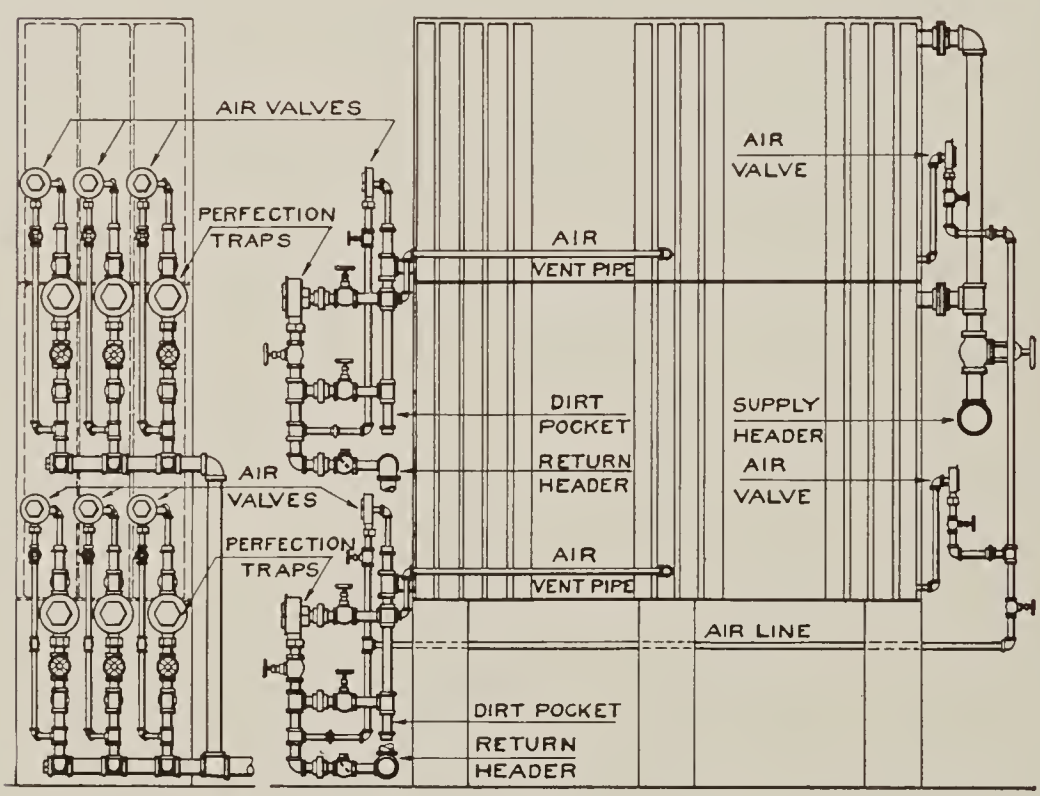
The McAlear Pump produces a vacuum on both traps and pulls the water of condensation and air from the heating system back to the traps discharging the air to the atmosphere and the water into the boiler. You will also note that the pump discharges into the lower trap, if you should desire to save the water of condensation from the pump. By saving this water and discharging it back into the boiler there will be no cost in the operation of the pump except the loss of a few heat units which would be the difference between the temperature of the steam entering the pump and the temperature of the water discharged from the pump.

A Duplex Water Feeder is provided for the boiler and connected up as indicated so that in case makeup water is required, it will be automatically taken care of by the boiler feeder and if for any reason you get too much water into the boiler, it will automatically discharge same to the sewer.

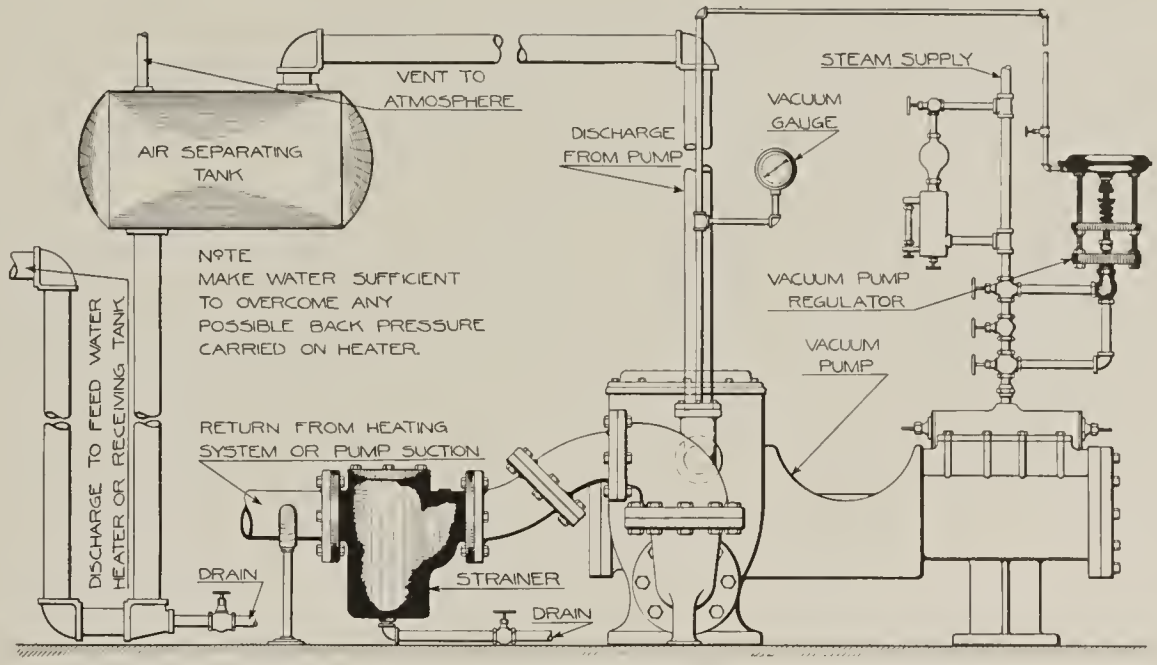
To make sure that there will always be sufficient pressure on the boiler to operate the McAlear Return Traps, we would advise the placing of a pressure retaining valve in the supply to the heating system so that when the pressure drops below the point at which the return traps will operate the pressure retaining valve will close off automatically and prevent steam from escaping from the boiler into the heating system, thereby preventing the possibility of draining the boiler of water and the flooding of the traps with the water of condensation from the heating system.




Connections to blast coils.




Drawings showing method of making return line vacuum heating system connections to Vento Radiation and Blast Coils.




The above application drawing shows manner of installing a steam driven vacuum pump in connection with a two pipe vacuum system of heating. The discharge from the pump is connected with the air separating tank placed at some distance above the boiler feed pump or heater, so that the water of condensation will gravitate to the boiler feed pump or feed water heater. The air exhausted from the system is discharged to the atmosphere through the small vent pipe which is run directly to the atmosphere.

In the water discharge connection from air separating tank there should be provided a water seal in the manner indicated and the discharge connected to a feed water heater, receiving tank, or boiler feed pump direct.

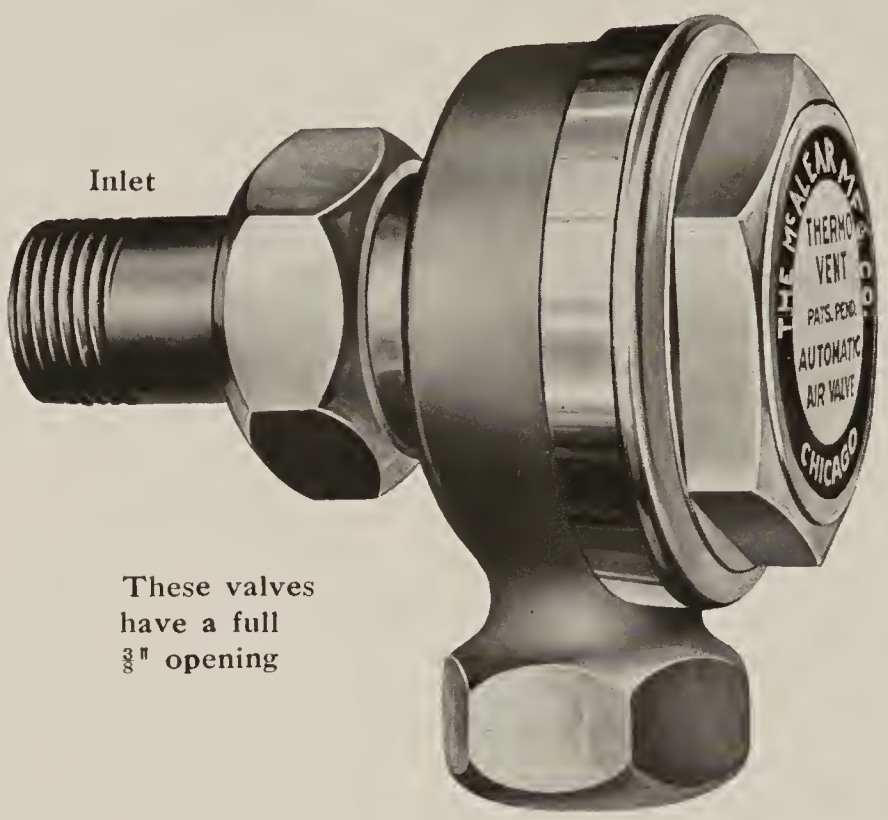
There should always be placed in the suction of a vacuum pump, whether steam driven or otherwise, a suction strainer for the purpose of collecting any dirt or sediment that might be carried back with the water of condensation which would, if not collected in a strainer, interfere with the operation of the pump and cause the cylinder and valves to cut and wear to a much greater degree than if the pump had nothing but clear water to handle which would be the case if a strainer is installed as above indicated.

A steam driven vacuum pump should be equipped with a pump governor that would control the speed of the pump and maintain a constant vacuum on the pipe lines at all times. If a governor is used, the lubricator should be placed in the steam supply above the governor so that the oil on its way to the pump cylinder would keep the governor well lubricated.

If all connections are made about as indicated on drawing, there will be no question as to the proper working of the apparatus and the results obtained.

For Vacuum Pump Governors and Suction Strainers, see pages 58 and 59.

# McAlear Prefection Radiator Trap




These valves have a full ⅜" opening

Actual Size
No. 28

No. 28, illustrated in section on the opposite page, is used in connection with Two Pipe Vacuum or Vapor Heating Systems. The construction is such that when the radiators are operated under a vacuum, the valves will close and prevent short circuiting and heating of radiators through return connections. They perform a three-fold duty—permit the escape of water and air in large quantities—but will close absolutely tight against steam—and when the radiator is shut down, they act as a check valve and prevent steam, air and water from gaining admission to the radiator when same is not in service—all of which is very necessary in Modulating or Vapor Heating Systems.

McAlear Perfection Radiator Traps are non-adjustable, self cleaning, absolutely automatic, noiseless and "fool" proof. Jet water in the suction of the Vacuum Pump is not required if McAlear Perfection Radiator Traps are used.

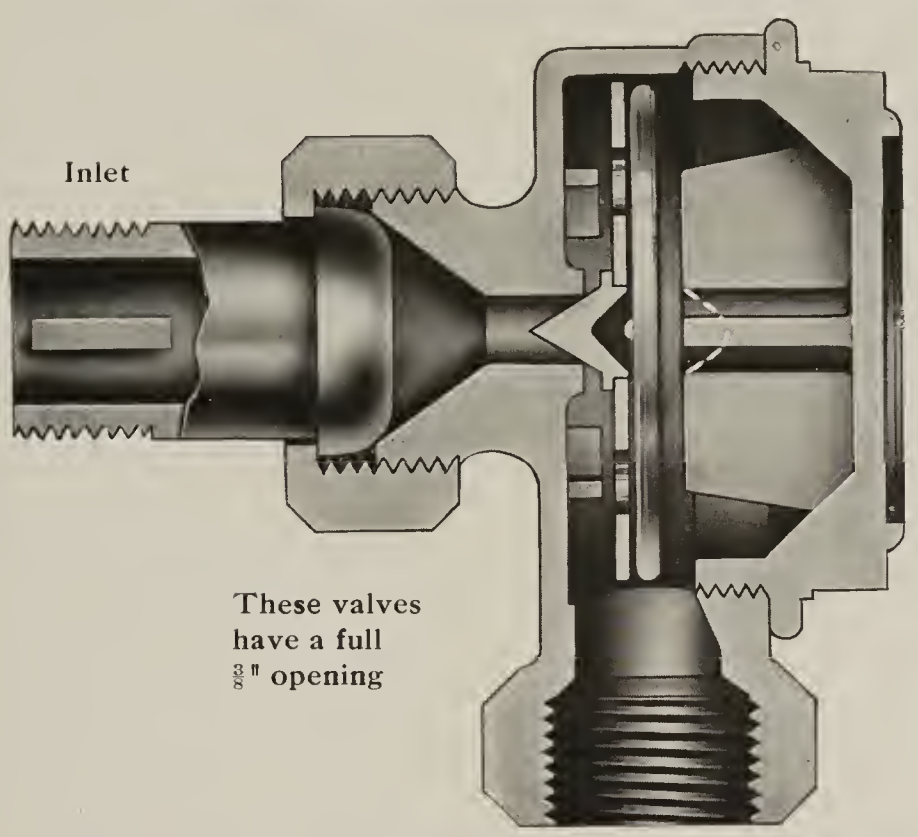
Another advantage—these traps can be used right or left hand corner by simply turning the outlet on an angle of 45 degrees, or directly on the side, if desired. We advise, however, that the valve outlet be placed on an angle of 45 degrees because in that position the valve will drain properly when the plant is shut down.

For Application, see pages 37, 38 and 40.

For Ordering, see page 47.

For Prices and Dimensions, see page 47.

# McAlear Perfection Radiator Trap




Actual Size
No. 28

## Size, Face to Face and over-all Dimensions of Perfection Radiator Traps

| No. | Pipe Connections | Face of Outlet to Center of Inlet | Face of Inlet to Center of Outlet | Diameter of Valve Body |
|---|---|---|---|---|
| 28 | 1/2 | 2 1/16 | 2 1/2 | 2 3/8 |

## Capacity and Price of Perfection Radiator Traps, Nos. 28-30-32

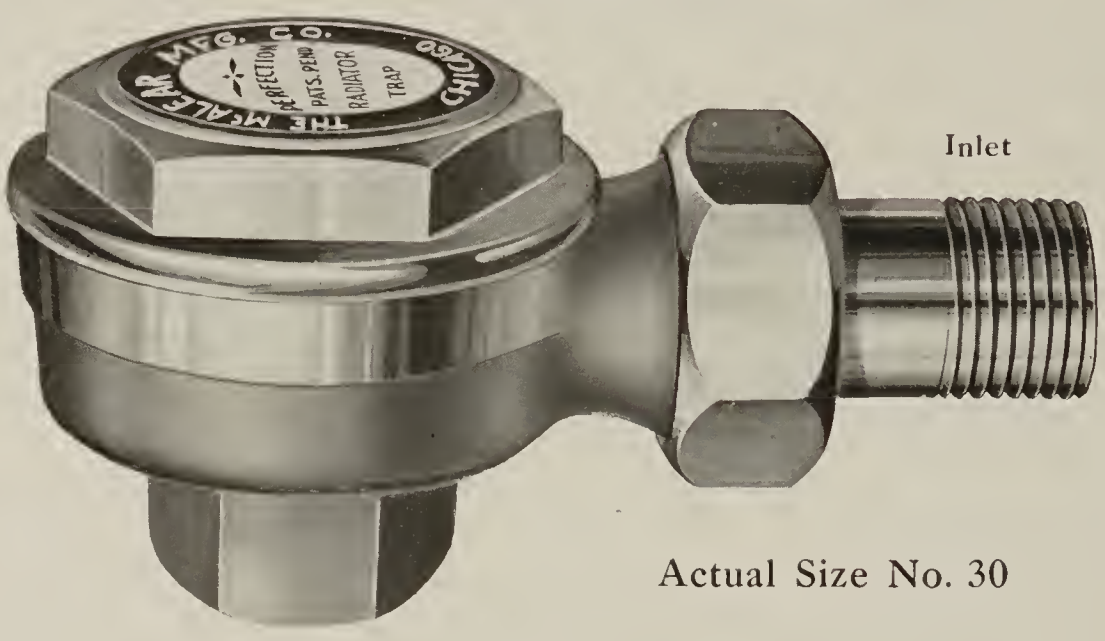
| Nos. | Capacity in Sq. Ft. of Direct Radiation | PRICE All Brass Nickel Plated | PRICE All Brass Plain | PRICE Iron Body With Brass Cap Plain |
|---|---|---|---|---|
| 28-30-32 | 300 | $7.00 | $6.00 | $6.00 |

Liberal discounts from the above prices will be given on application.

The above capacity rating is based on square feet of direct radiation, with radiators operating in normal temperatures condensing 3/10 of a pound steam per square foot per hour.

The McAlear Perfection Radiator Traps will close tight against a steam pressure of 50 lbs. when discharging direct to the atmosphere or into a vacuum of from 1 inch to 25 inches.

# McAlear Perfection Radiator Trap




Actual Size No. 30

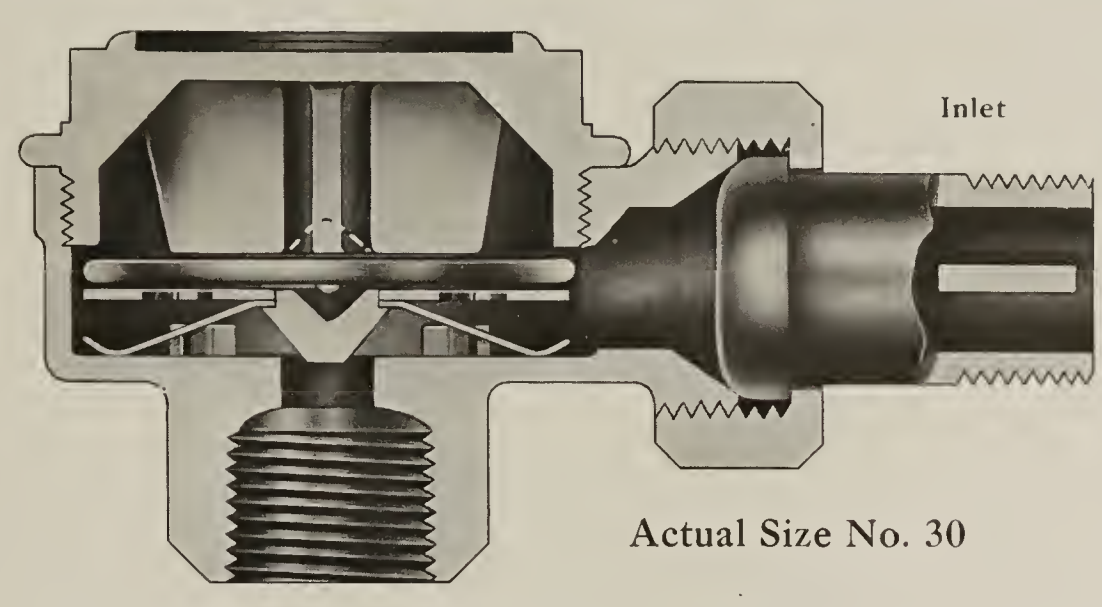
## Three Different Forms from which to Make Your Selection

The McAlear Perfection Radiator Traps are made in three different forms. Our standard trap is figure No. 28, illustrated on pages 46 and 47. This trap differs from figure No. 30 and 32 in that the expansion disc and closing disc is placed vertically on the discharge side of the valve while in figures No. 30 and 32 the expansion disc and closing disc are placed horizontally on the inlet side of the valve. Figure No. 32, however, differs from No. 30 in that we have provided a sealed adjustment whereby the valve can be adjusted on the job to meet local conditions. Thus you will see that we are in position to supply your requirements with any form of valve you desire.

Our figure No. 28 traps can be used as either right or left hand corner and figures No. 30 and 32 as right and left hand corner by turning the outlet on the side. We would prefer, however, that you use figure No. 28 as an angle valve or as a right and left hand corner with the discharge outlet at an angle of forty-five degrees and figures No. 30 and 32 as an angle valve. If the right and left hand corner is desired, a street ell can be provided for the outlet.

Figure No. 28 Perfection Radiator Traps are also made without union connection. That is, the part that connects with the Radiator is tapped with a left hand pipe thread and in connecting the valve to a radiator, a right and left nipple is used. Prices on valves made up in this form are the same as on our figure No. 28.

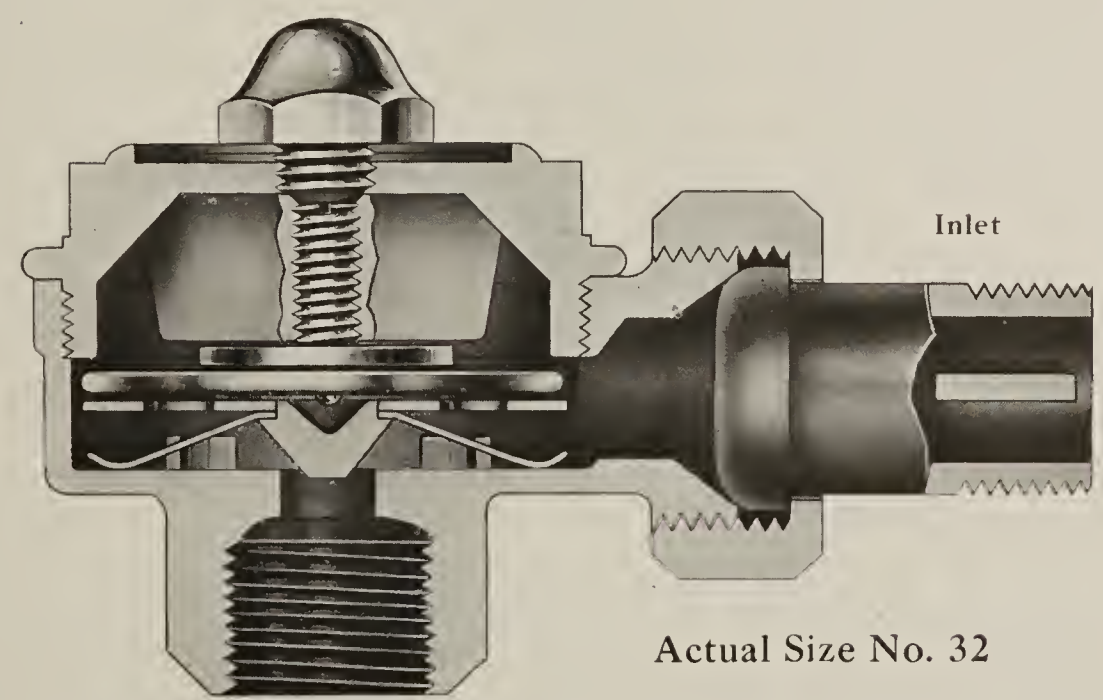
# The McAlear Perfecton Radiator Top




Actual Size No. 30

The above illustration shows a sectional view of the McAlear Perfection Radiator Trap with the Thermostatic disc placed horizontally on the inlet side. This valve, if you will note, is provided with a spring underneath the closing disc to keep the valve open when cold or when not in service. If you will note, this valve is non-adjustable and can be used in almost any form you wish to place it in.

For prices, see page 47.




Actual Size No. 32

Figure No. 32 is similar in construction to figure No. 30, the only differenee being that it is provided with an adjustment which makes it possible for the contractor to adjust the valve to meet local conditions on the job, all of which can be very readily done by removing the hex cap on top of adjustment screw.

For prices and dimensions, figure No. 30 and 32, see page 47.

# McAlear Perfection Radiator Trap

Inlet

The traps are non-adjustable and absolutely automatic and reliable in every way.

For prices and dimensions, see page 51.

In ordering, please state the service and pressures.

## No. 34

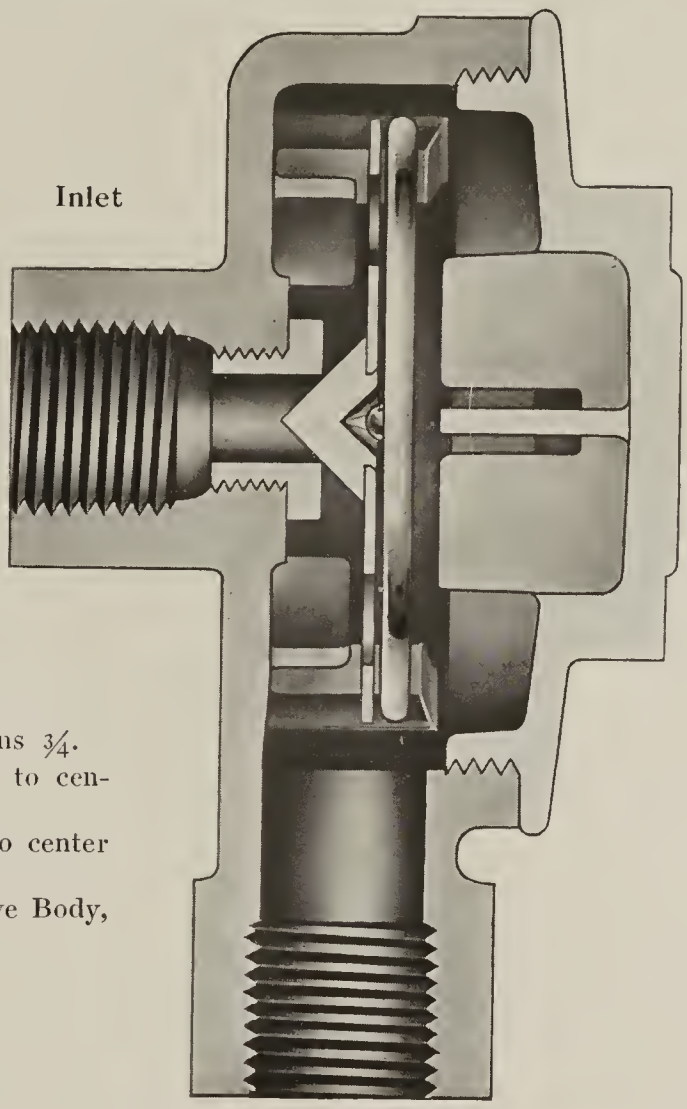
The above cut illustrates the exterior of our McAlear Perfection Radiator Trap and the cut on page 51, the interior. This trap is used to drain large coil surfaces such as blast coil worn, dry kiln work, wall coils, heating mains, etc.

The traps are constructed with their bodies of the best quality of gray cast iron with discs and seats of a good quality of phosphorous bronze. The caps are constructed of brass which makes them very easy to remove when it becomes necessary to do so.

The traps will close absolutely tight against twenty-five pounds steam pressure when in service. We manufacture them to close against higher pressures, up to and including 100 pounds, if desired. In ordering, please state the pressure that traps must close against and also state whether they discharge against a pressure or into a vacuum.

These traps are made in angle pattern only and when used must be placed as shown in cut with the disc standing vertically on the discharge side.

# McAlear Perfection Radiator Trap




No. 34.

Pipe connections ¾.

Face of outlet to center of inlet 2⅞.

Face of inlet to center of outlet, 1⅞.

Diameter of Valve Body, 3¾.

No. 34

## Capacity and Prices of Perfection Radiator Traps

| No. | Capacity in Sq. Ft. of Direct Radiation | PRICE All Brass Nickel Plated | PRICE All Brass Plain | PRICE Iron Body With Brass Cap Plain |
|---|---|---|---|---|
| 34 | 1,500 | $16.00 | $14.00 | $12.00 |

Liberal discount will be given on application.

The above capacity rating is based on square feet of direct radiation, with radiators operating in normal temperatures condensing 3/10 of a pound of steam per square foot per hour.

The McAlear Perfection Radiator Traps will close tight against a steam pressure of 50 lbs. when discharging direct to the atmosphere or into a vacuum of from 1 inch to 25 inches. We manufacture traps to operate on higher pressures if desired. In ordering, please state the service and pressures.

# McAlear Perfection Trap

Inlet

No. 36

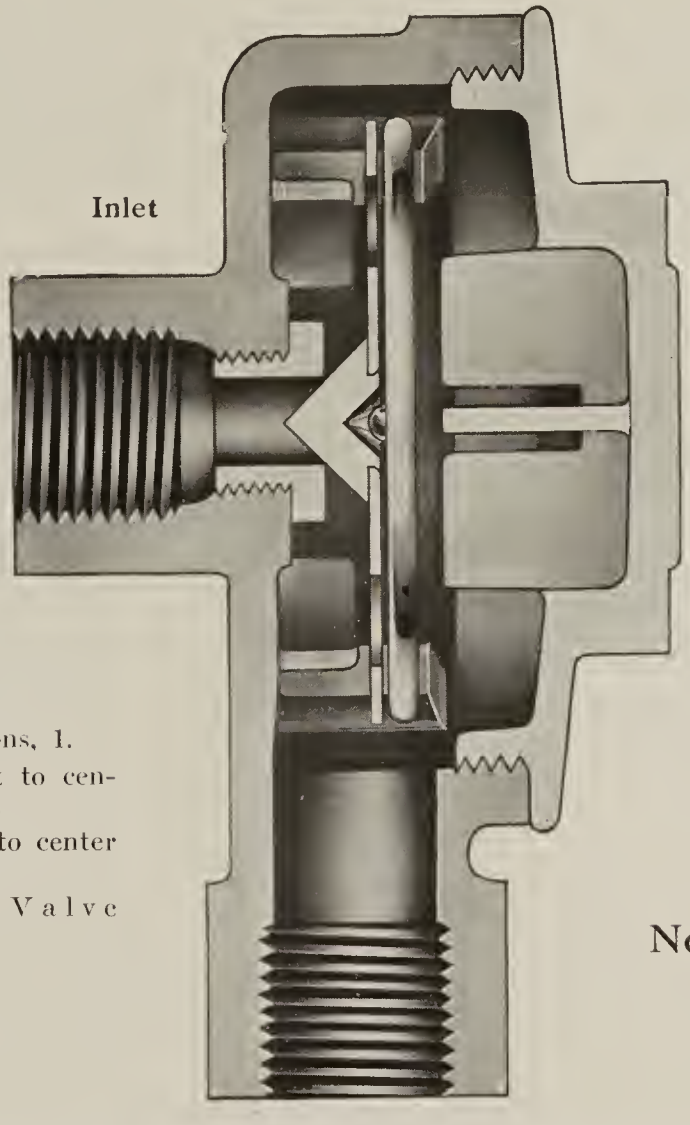
The above illustration shows the McAlear One Inch Perfection Radiator Trap which is constructed similar to the ¾ inch, figure No. 34, page 51. These traps are especially designed for use in connection with heating systems where a large quantity of water must be handled in the quickest possible time. They are simple in construction and absolutely positive and reliable in operation.

The discs and seats are made of the same high grade material as our ¾ inch, figure No. 34. The caps and bodies are also made of the same material.

These traps will, when used in connection with vacuum or low pressure heating systems, close off absolutley tight against 25 pounds steam pressure. We manufacture these traps to operate on higher pressures up to and including 100 pounds.

In ordering traps, please state the service, whether for use in connection with low pressure heating or vacuum work or for use in connection with high pressure traps, etc. Always state the pressures that trap must close against.

# McAlear Perfection Radiator Trap




No. 36.

Pipe connections, 1.

Face of outlet to center of inlet, 2⅞.

Face of inlet to center of outlet, 1⅞.

Diameter of Valve Body, 3¾.

No. 36

## Capacity and Prices of Perfection Radiator Traps

| No. | Capacity in Sq. Ft. of Direct Radiation | PRICE All Brass Nickel Plated | PRICE All Brass Plain | PRICE Iron Body With Brass Cap Plain |
|---|---|---|---|---|
| 36 | 2,000 | $25.00 | $22.00 | $18.00 |

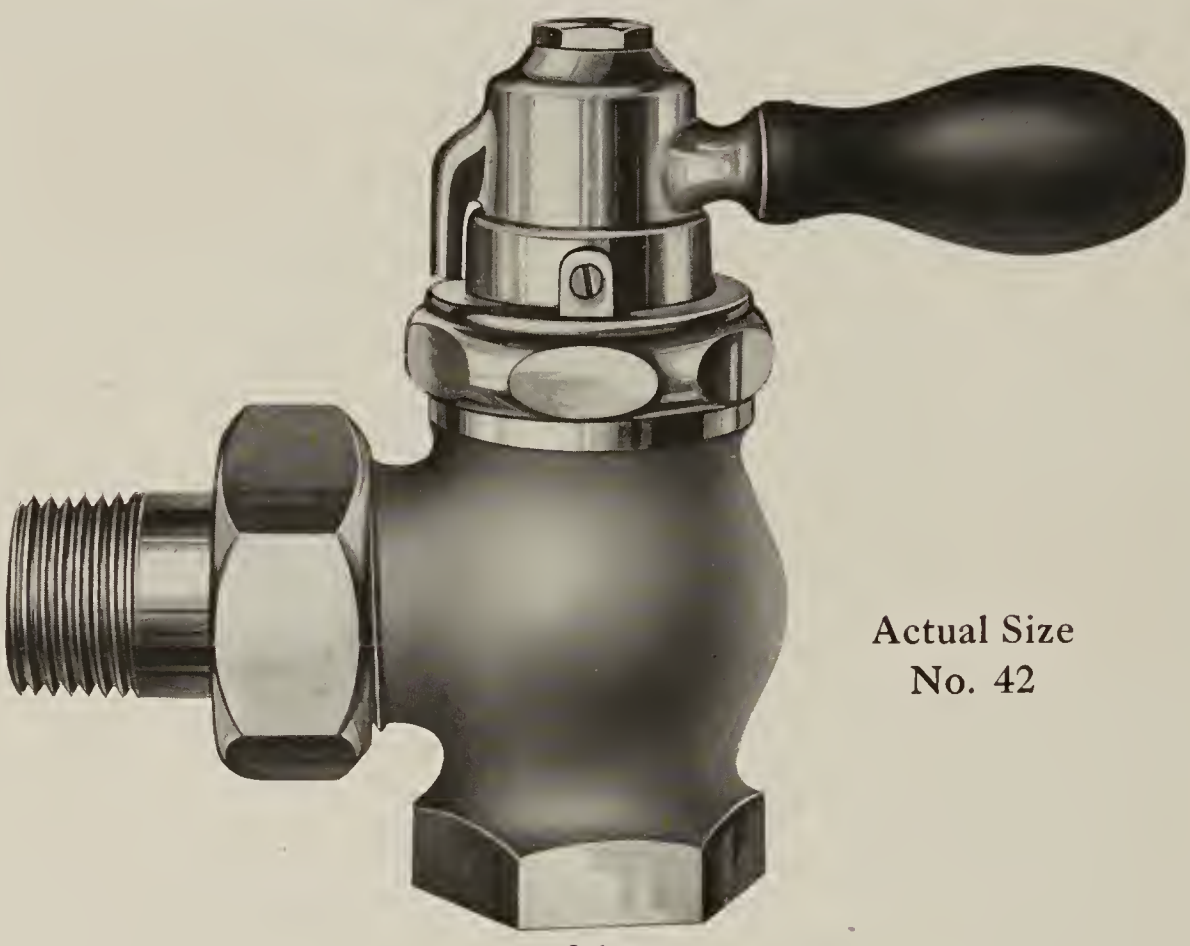
Liberal discounts will be given on application.

The above capacity rating is based on square feet of direct radiation, with radiators operating in normal temperatures condensing 3/10 of a pound of steam per square foot per hour.

The McAlear Perfection Radiator Traps will close tight against a steam pressure of 50 lbs. when discharging direct to the atmosphere or into a vacuum of from 1 inch to 25 inches. We manufacture traps to operate on higher pressures if desired.

In ordering, please state the service and pressures.

# McAlear Packless Graduating Valve



Actual Size
No. 42

Inlet

## Improvement Over All Other Styles

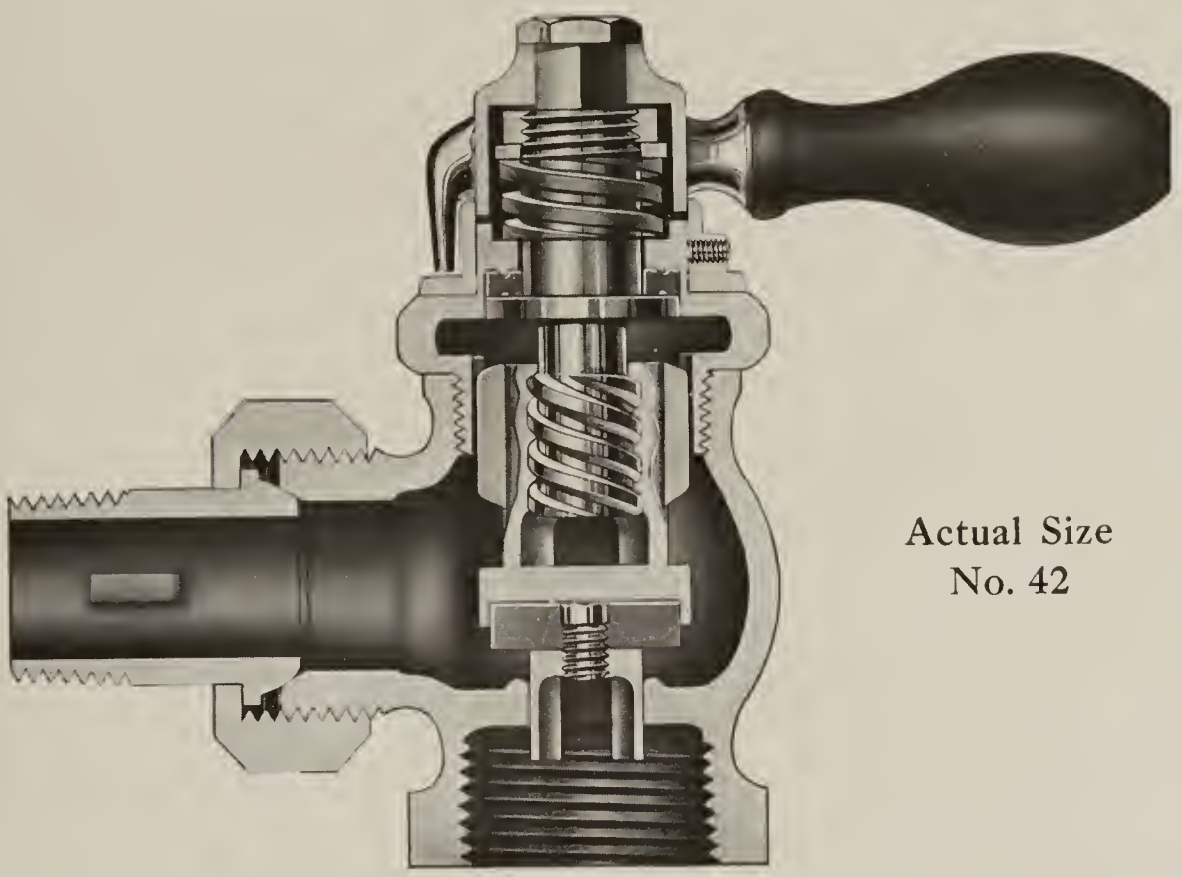
The McAlear Packless Graduating Valve has advantages over all other styles and makes—it embodies all the scientific principles necessary in manufacturing a successful operating valve of this character—it is the last word in graduating and modulating.

Here you have a valve constructed of the best steam metals, with special composition discs. The Packless Discs are of exactly the same construction as used in other valves of the same type of which there are over a million in use with a record of not even one ever having been changed.

The castings are highly finished—the handles are made of mahogany, strongly reinforced so that they cannot chip or crack—the valves are all heavily nickel plated, guaranteed to retain a bright and handsome appearance.

The McAlear is not only the handsomest graduating valve, but it is the simplest and best construction of any packless valve in existence. To obtain the highest degree of efficiency, adopt the McAlear Valve as the method of inserting various size discs for various size radiators. The adjustments on top of valve to regulate the valve travel are in themselves advantages worth your most serious consideration.

# McAlear Packless Graduating Valve



Actual Size
No. 42

## Prices and Dimensions

| SIZE | ½ | ¾ | 1 | 1¼ | 1½ |
|---|---|---|---|---|---|
| Rough Body, plated all over..... | $4.15 | $4.80 | $5.75 | $7.40 | $9.10 |
| Face of outlet to center of inlet... | 1¼" | 1 5/16" | 1½" | 1¾" | 2" |
| Face of inlet to center of outlet... | 2½" | 2 7/8" | 3¼" | 3½" | 3 7/8" |

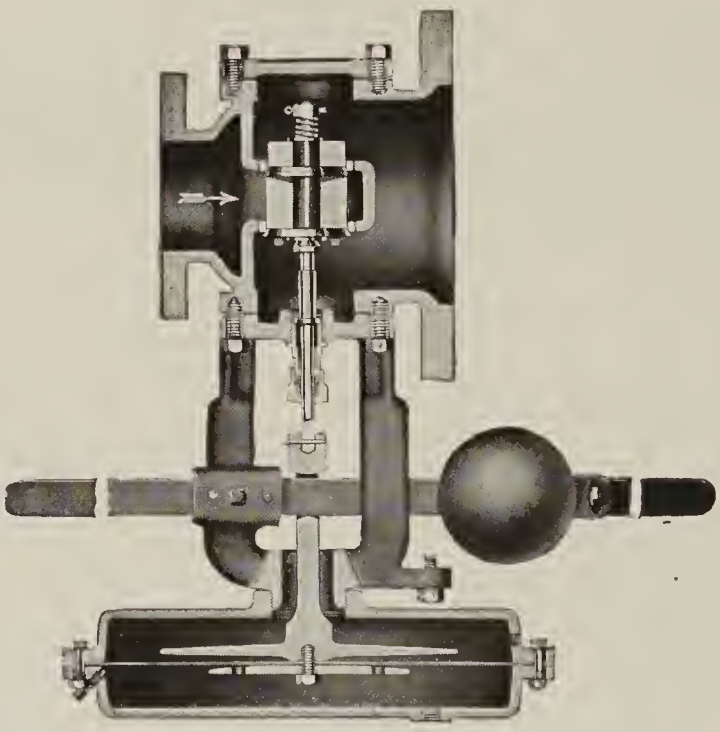
Liberal discounts will be given to the trade.
Made in Angle Pattern only.

## Various Size Discs for Graduated Valves

| | | | | | |
|---|---|---|---|---|---|
| Size of Valve, ½" | | | | | |
| No. of Discs..... | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 |
| Sq. Ft. of Direct Radiation..... | 1' to 20' | 20' to 35' | 35' to 50' | 50' to 65' | 65' to 80' |
| Size of Valve, ¾" | | | | | |
| No. of Discs..... | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 |
| Sq. Ft. of Direct Radiation..... | 1' to 25' | 25' to 50' | 50' to 75' | 75' to 100' | 100'to125' |
| Size of Valve, 1" | | | | | |
| No. of Discs..... | No. 11 | No. 12 | No. 13 | No. 14 | No. 15 |
| Sq. Ft. of Direct Radiation..... | 25' to 50' | 50' to 75' | 75' to 100' | 100'to150' | 150'to200' |
| Size of Valve, 1¼" | | | | | |
| No. of Discs..... | No. 16 | No. 17 | No. 18 | No. 19 | No. 20 |
| Sq. Ft. of Direct Radiation..... | 75' to 100' | 100'to125' | 125'to150' | 150'to175' | 175'to200' |
| Size of Valve, 1½" | | | | | |
| No. of Discs..... | No. 21 | No. 22 | No. 23 | No. 24 | No. 25 |
| Sq. Ft. of Direct Radiation..... | 100'to125' | 125'to150' | 150'to175' | 175'to200' | 200'to250' |

Prices given on application.
In ordering valves please state the size and number of disc required.

# Kieley Special Low Pressure Vapor Regulating Valve



No. 44

## Prices and Weights

| Size | 1x2 | 1¼x2½ | 1½x3 | 2x4 | 2½x5 | 3x6 |
|---|---|---|---|---|---|---|
| Price | $83.00 | $42.50 | $53.50 | $72.00 | $96.00 | $126.00 |
| Weight | 90 | 95 | 98 | 100 | 115 | 125 |

| Size | 4x6 | 4x8 | 5x10 | 6x12 | 8x14 | 8x16 |
|---|---|---|---|---|---|---|
| Price | $140.00 | $187.50 | $242.00 | $325.00 | $400.00 | $500.00 |
| Weight | 160 | 165 | 185 | 235 | 335 | 370 |

Valves are made in straight and differential sizes.

Size 1 x 2″ made with screwed ends only. Sixes 1¼ x 2½″ up to 2 x 4″ are made with small ends screwed and large ends flanged. All other sizes above 2 x 4″ have both ends flanged.

Maximum reduced pressure must not exceed three pounds.

Ordering—It is very important that the following information be given:

First: Initial or High Pressure.

Second: Reduced or Delivery Pressure.

Third: Service for which the reduced pressure is used.

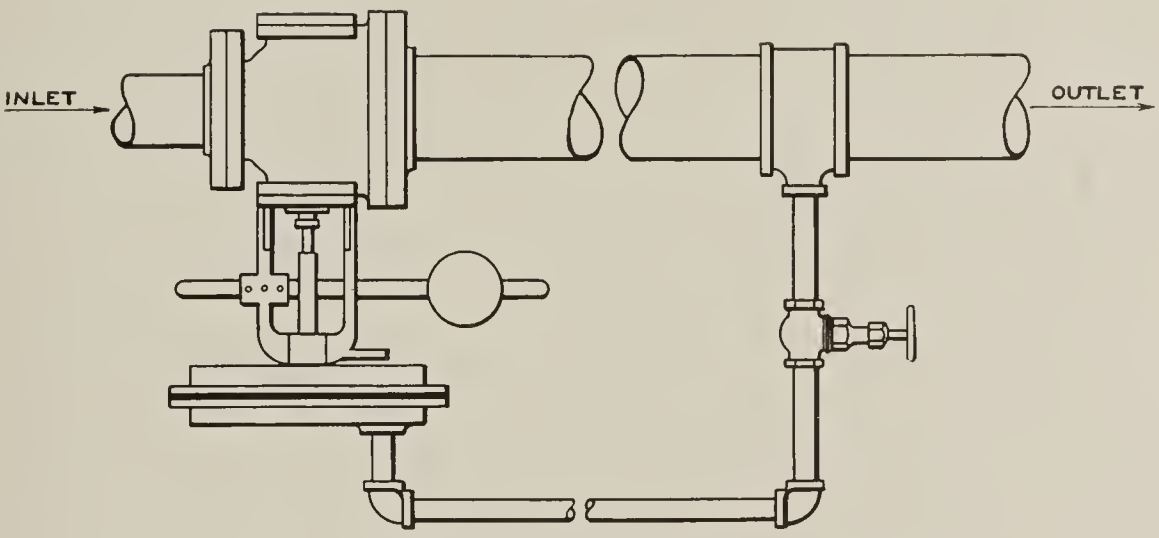
Fourth: State if companion flanges and bolts are required.

Flanges—All flanged valves are drilled as per standard. Companion flanges and bolts are extra and furnished only when so ordered.

There has been a growing demand for a special low pressure vapor regulating valve that would control steam pressures in ounces in place of pounds. This type of valve is illustrated on page 56 and is especially designed for use in connection with vacuum vapor and modulation systems of heating. Its design and construction makes it possible to control any reduced pressure with practically no variation from the point at which it is set.

These regulating valves are made in either straight or differential pattern suitable for any initial pressure up to 125 pounds and a maximum reduced pressure of three pounds to atmosphere or below.

These valves are constructed of good quality grey cast iron with seats and discs of the best government metal. To adjust the valve to maintain any given reduced pressure, move the weight in or out on lever until the valve establishes the pressure you desire. If close regulation is desired, we would recommend that two weights be used as better regulation can be had and maintained by using two weights than is possible to get with one.

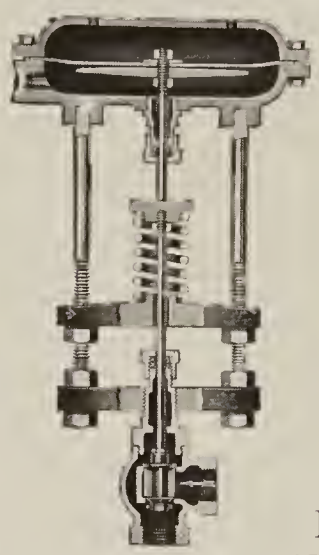



## Application of the Kieley Special Low Pressure Vapor Regulating Valve

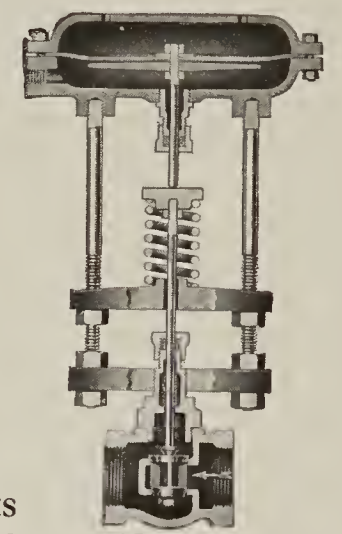
In making the diaphragm connection, be sure to use a T in the main line as indicated in order to insure a proper water seal for the protection of the diaphragm.

Do not tap the pipe for this connection as it is almost impossible to screw a pipe into another one without having the pipe project some distance into the other which would tend to prevent the water of condensation that would take place in the main from getting into the small pipe leading to the diaphragm. Therefore, we recommend that a T be placed in the line for the diaphragm connection as indicated.

# Kieley Vacuum Pump Regulators



No. 46



No .48

## Prices and Weights

No. 46 Screwed End Angle.

| Size | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2 | 2½ | 3 |
|---|---|---|---|---|---|---|---|---|---|
| Weight | 39 | 41 | 42 | 43 | 44 | 45 | 55 | 60 | 70 |
| Price | $30.00 | $30.00 | $35.00 | $40.00 | $45.00 | $50.00 | $50.00 | $60.00 | $75.00 |

No. 48 Screwed End Globe.

| Size | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2 | 2½ | 3 |
|---|---|---|---|---|---|---|---|---|---|
| Weight | 39 | 41 | 42 | 43 | 44 | 45 | 55 | 60 | 70 |
| Price | $30.00 | $30.00 | $35.00 | $40.00 | $45.00 | $50.00 | $50.00 | $60.00 | $75.00 |

All sizes up to 2″ inclusive have screw ends; 2″ and larger can be furnished with flanged ends. Dimensions and weights on application.

Ordering—It is very important that the following information be given:

First: Initial Steam Pressure.

Second: The number of inches of vacuum you wish to maintain on pump suction.

Third: State if pump is used in connection with a vacuum return line heating system or other service.

Fourth: State if globe or angle pattern is required.

Service—For controlling the speed of vacuum pumps and the amount of vacuum carried on the pump suction.

Regulation—Will absolutely control the speed and maintain a uniform vacuum on the pump suction at all times, the variations between the high and low vacuum being less than 1″.

Its simplicity of construction enables quick adjustment of moving parts.

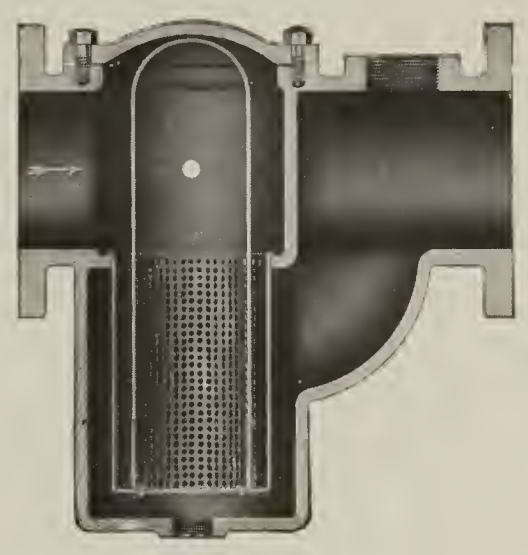
Working Pressure—Suitable for 150 lbs. steam pressure or less.

Regulation: Compress spring to increase vacuum, and relax to decrease.

Governor can be arranged to give a gradual or a quick closing effect at an additional cost. This applies to both globe and angle patterns.

Construction—They are made in angle and globe pattern. Sizes up to 2″ inclusive have Government Bronze bodies, seats and discs, with screwed ends; size 2″ and larger have iron bodies with Government Bronze seats and discs, with either screwed or flanged ends.

# Kieley Suction Stainer




No. 50

## Prices and Weights

| Size | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Weight | 35 | 55 | 60 | 90 | 95 | 135 | 140 | 150 |
| Price | $15.00 | $18.00 | $22.00 | $26.00 | $30.00 | $55.00 | $60.00 | $75.00 |

Prices on larger sizes furnished on application.

*Adapted for Any and All Services.*

The Kieley Suction Strainers are suitable for any and all services. They are especially adapted for use in connection with vacuum heating systems, vacuum pumps, boiler feed pumps, house pumps, fire pumps, water works pumps and oil pumps.

No pump should be installed without a Kieley Strainer, as it is the best possible protection against dirt or sediment lodging in the suction valves and cylinders which at times causes the pumps to lose their priming and may possibly cause some of the movable parts to break from the pounding and jarring so frequently experienced in pumps running at high speed without water.

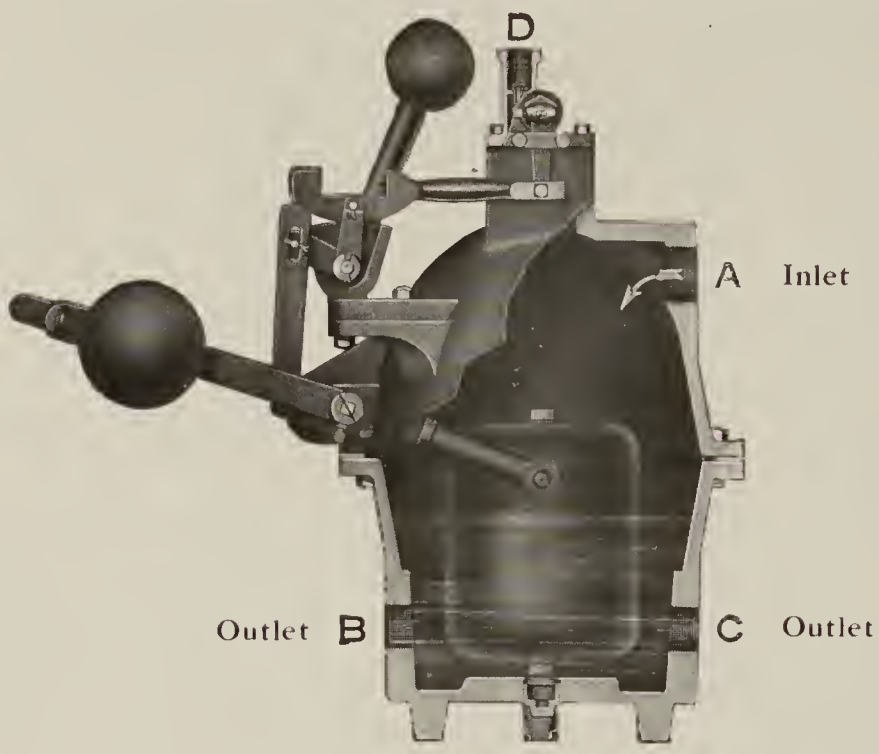
The strainers also prevent grit, sand and other foreign matter, so often found in water, from getting into the valves and moving parts.

The Kieley Strainers are provided with a movable, flanged cap on top so that the strainer basket can easily be removed for cleaning without disturbing any of the pipe connections. The strainer basket is constructed of heavy sheet copper with brass handle. The basket has sufficient free area to avoid any possible restriction to the flow of water through it. These strainers must not be used where the pressure is over seventy-five pounds.

CONSTRUCTION—Made in flanged end pattern only with cast iron bodies.

The illustration on page 45 shows the proper method of using and installing the Kieley Suction Strainer. These strainers are very effective when used in connection with our Water Jet Controllers.

# McAlear Air Exhauster and Return Trap




## No. 52

SERVICE—The McAlear Air Exhauster and Return Trap is used for the purpose of handling water of condensation from heating systems, drip tanks, drains, etc., raising it from a lower level to a higher one, discharging it into boilers, receiving tanks, feed water heaters or the sewer direct.

These traps will automatically discharge water against any head so long as the pressure on the live steam inlet to the trap equals one pound pressure to every 18″ lift on the discharge.

These traps are absolutely automatic and positive in operation, and will when properly installed, handle either hot or cold water in large quantities.

A and C—Inlet.
B—Discharge.
D—Steam Inlet.

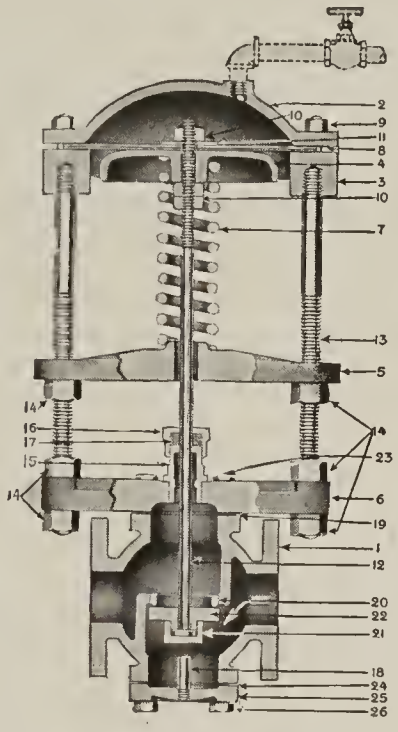
For application drawing, see pages 38-40-42.

## Prices, Dimensions, Weights and Capacities
## No. 750—Kieley Pump or Lift Trap

| Number of trap | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| A—Inlet and outlet | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 4 |
| B | 16 | 16 | 16 | 16 | 16 | 17 | 20 | 25 |
| C | 22 | 22 | 22 | 22 | 22 | 23 | 24 | 27 |
| D | 24½ | 24½ | 24½ | 24½ | 24½ | 27 | 30½ | 38¼ |
| E | 30 | 30 | 30 | 30 | 30 | 31½ | 34 | 39½ |
| F—Steam | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ | ¾ |
| G—Exhaust | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ | ⅜ |
| Cap., lbs. wat. per hr. | 480 | 600 | 1,000 | 2,000 | 3,000 | 4,000 | 7,500 | 10,500 |
| Cap., sq. ft. of radiation | 1,600 | 2,000 | 3,400 | 6,400 | 10,000 | 13,400 | 25,000 | 35,000 |
| Cap., lin. ft. 1″ pipe | 5,000 | 6,000 | 10,000 | 20,000 | 30,000 | 40,000 | 75,000 | 110,000 |
| Weight | 225 | 225 | 225 | 225 | 225 | 235 | 325 | 600 |
| Price | $90.00 | $100.00 | $150.00 | $200.00 | $250.00 | $300.00 | $550.00 | $650.00 |

# Kieley Pressure Retaining Valve

No. 54




## Prices

| Size | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ |
|---|---|---|---|---|---|---|---|---|
| Price | $27.50 | $30.00 | $35.00 | $42.50 | $50.00 | $65.00 | $82.50 | $95.00 |
| Size | 4 | 5 | 6 | 7 | 8 | 10 | 12 | |
| Price | $115.00 | $150.00 | $190.00 | $240.00 | $300.00 | $375.00 | $500.00 | |

Made screwed ends up to 4″ inclusive, and flanged ends 2″ and larger.

Ordering—It is very important that the following information be given:

First: Pressure to be retained.

Second: State Service.

Third: State whether regular or extra heavy pattern.

Fourth: State if companion flanges and bolts are required.

Flanges—Companion flanges and bolts are always extra and furnished only with valves when so ordered.

Service—The Kieley Pressure Retaining Valve is used principally in connection with low pressure heating boilers for retaining the required amount of boiler pressure for operating boiler feed pumps, return traps, etc., used for returning the water of condensation from the heating system back to the boilers. If for any reason the boiler pressure drops below the point at which the feed pumps or return traps will operate, the valve will close automatically and prevent the escape of steam from the boiler into the heating system, and by so doing, eliminates any possibility of burning the boiler or flooding the heating system with water of condensation.

Regulation—To increase the boiler pressure compress spring, and to decrease it relax spring.

Working Pressure—Standard Weight: 125 lbs. Extra Heavy: 150 lbs.

Valves are constructed of cast iron with Composition working parts.

For application drawing, see page 42.

# McAlear Vapor Regulator

## For Controlling Dampers and Check Drafts on Vapor Heating Systems

No. 56

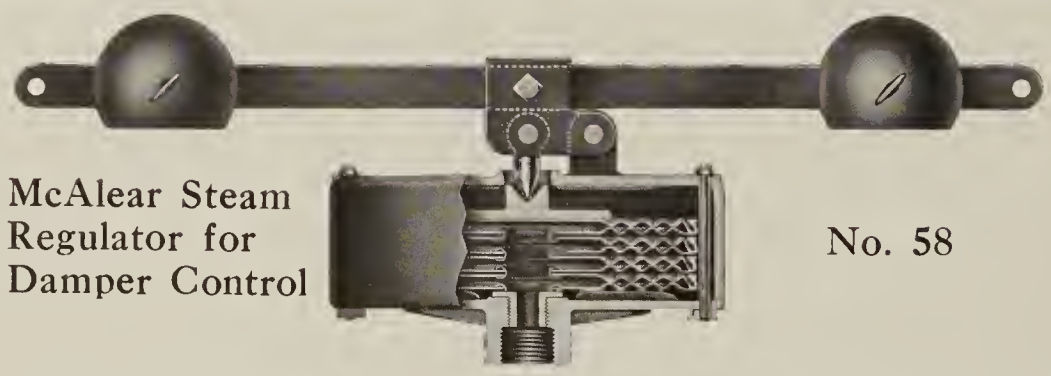
The McAlear Vapor Regulator is very sensitive and unusually powerful—it will control boiler pressures in ounces from "0" to one pound. In other words, you can maintain any pressure in ounces you desire between nothing and one pound with but slight variation from the point at which the regulator is set.

The size of the bellows is 12″ diameter, with four flexible walls which gives the required travel of ½″ without causing any strain whatsoever on any of its parts. This travel of ½″ when distributed on the four walls is only an expansion of ⅛″—less than 100% of what each wall would actually expand with safety.

These damper regulators must not be used on steam pressures above 3 pounds, nor on a vacuum of over five inches.

The McAlcar Vapor Regulator No. 56 comes with a 1″ steam connection, shipped complete with lever and two weights, together with the "S" hooks, two ceiling pulleys, one 1″ nipple and 12 feet of chain.

**Shipping Weight, 35 lbs. Price of Regular Complete, $30.00**



McAlear Steam Regulator for Damper Control

No. 58

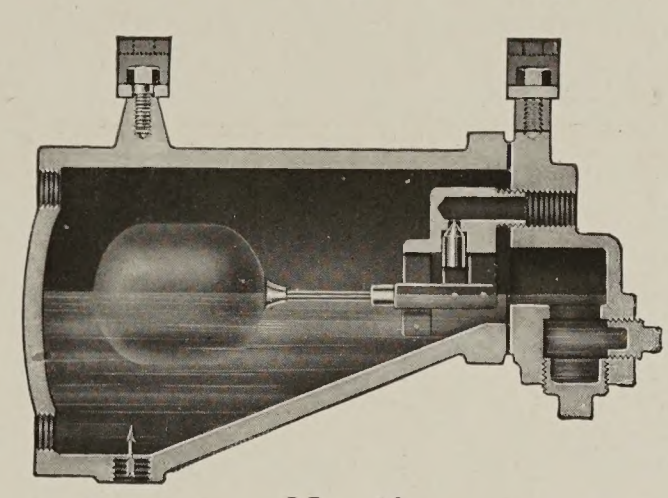
This regulator is composed of four 8″ discs which travel in actual service about ½″—constructed of special bronze which not only insures sensitiveness and durability, but absolute reliability.

It will operate on the slightest variation in pressures and by simply moving the weights on the lever you can easily control and maintain any boiler pressure desired between minimum and maximum.

The McAlear Steam Regulator No. 58 comes with a 1″ steam connection, shipped complete with lever and two weights, together with the necessary "S" hooks, two ceiling pulleys, one 1″ nipple and 12 feet of chain.

**Shipping Weight, 15 lbs. Price of Regular Complete, $20.00**

# The Kieley Air Trap




No. 60

SERVICE—The Air Trap above illustrated is suitable for services in connection with steam or hot water heating systems for relieving the mains and radiators of air automatically.

The seats and discs are constructed of a good quality of bronze and when in service will close absolutely tight against the water pressure and open automatically to relieve the system of air, but under no circumstances will the trap discharge water.

These traps are usually placed at high points in the system or where air is liable to accumulate.

This trap can also be used in connection with water works systems to relieve the mains at different points of air. If you will note we build these air traps in seven different sizes, which makes it possible for us to take care of any amount of air that may accumulate in cold water mains or hot water heating systems.

## Prices, Dimensions, Weights and Capacities
## High and Low Pressure

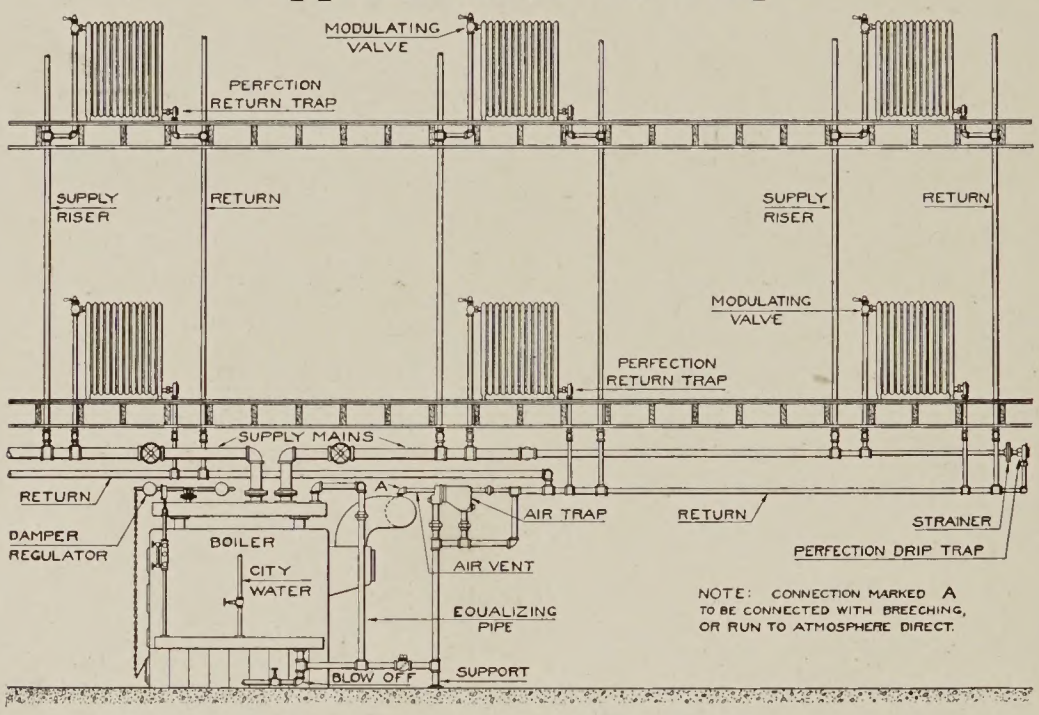
| Number of Trap | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| A | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 |
| B | 8¾ | 9⅝ | 10⅞ | 12 | 14⅛ | 15⅛ | 17⅛ | 18½ |
| C | 2⅛ | 2¼ | 2¾ | 3⅜ | 4¼ | 4½ | 4¾ | 6⅛ |
| D | 12¼ | 14½ | 16⅛ | 18 | 18⅛ | 20½ | 24 | 25½ |
| E | 3½ | 3⅝ | 4 | 3⅝ | 3⅝ | 4⅛ | 4⅛ | 4½ |
| F | 4½ | 5½ | 6⅝ | 7½ | 8 | 10¼ | 10¼ | 10¾ |
| Capacity, sq. ft., radiation | 900 | 1,300 | 2,000 | 3,300 | 5,000 | 8,300 | 11,500 | 16,500 |
| Weight | 30 | 40 | 50 | 55 | 65 | 105 | 130 | 145 |
| Price | $21 | $25 | $35 | $45 | $60 | $80 | $100 | $125 |

ORDERING—In ordering air traps it is very important that the following information be given on all orders:

First: Range of pressure on water mains.
Second: Does water pressure vary, and if so, to what extent?
Third: State if for use in connection with steam or hot water heating systems or cold water supply mains.
Fourth: State approximately, if possible, the amount of air in cubic feet per minute the trap must discharge.
Fifth: State if for use in connection with high or low pressure service.
Sixth: State if water gauge glass equipment is wanted. Water gauges are extra and are only furnished when so ordered.

For application see page 64.

# Application of Air Trap

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The-

# McALEAR System